DOCUMENT RESUME

ED 100 222 HE 006 121

TITLE	Proceedings of the Third Annual Conference of the City University of New York (November 1973).
INSTITUTION	City Univ. of New York, N.Y. Office of Univ. Relations.
PUB DATE	74
NOTE	103p.
EDRS PRICE	MF-$0.75 HC-$5.40 PLUS POSTAGE
DESCRIPTORS	College Students; Educational Innovation; *Educational Opportunities; English Education; *Higher Education; Interdisciplinary Approach; Mathematics Education; Models; *Open Enrollment; Reading Instruction; *Science Education; Student Needs; Universities; *Workshops
IDENTIFIERS	*City University of New York

ABSTRACT

This document reports the third annual conference of the City University of New York on Open Admissions. Following introductory remarks, proceedings of the English, mathematics, science, and reading workshops are presented with emphasis on models and innovative approaches. (MJM)

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PROCEEDINGS
OF THE
THIRD ANNUAL CONFERENCE OF THE
CITY UNIVERSITY OF NEW YORK

Wednesday, November 7
Thursday, November 8
1973

Held at
THE COMMODORE HOTEL
New York, New York

published by the Office of University Relations
of the City University of New York
1974

HE 006 121

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The Conference Theme

I have that function pleasant in any conference, of thanking those who have done so much to make our Conference possible. First, I have three appreciations. President Goldstein's support of our Conferences for three years and his mastery as host of the plenary sessions, have always done much to move our programs forward. It's a personal pleasure for me to offer our appreciation. Dr. Healy, once again, your remarks have been an inspiration to us who hear you. You let us know what our concepts and our philosophy not only should but can be. Chancellor Kibbee, all of us deeply appreciate your dedication and interest in what is today so essential to education. In the name of us all, thank you very much.

On behalf of Dean Leslie Berger, Executive Coordinator of the Conference and of myself, let me thank everyone who has worked so long and hard in creating this Conference. In particular, Miss Joan Jeffries and your Conference staff, we are deeply indebted to you for your work and the achievement you so unassumingly create. So, too, let me thank you, members of the Planning Committee who, giving generously of the time of your summer vacations, have made arrangements, established workshops, enlisted personnel, all in accordance with the well articulated guidelines established by Dean Berger. And let me assure you that your work made my own tasks infinitely lighter. For myself let me thank you.

I should tell one story about the Planning Committee this summer that fits this Conference. When the initial reports of the Planning Committee's recommendations came to me, I had to put out the preliminary program sent to all the delegates. We were rushed and it was summer and we had to get it out. So I reviewed the titles and we sent it out to the delegates. One of the titles confused me and I said—the title was—and you will remember it from your preliminary program perhaps—"Students Who Fail." I didn't know what to make of the title and I didn't know what they had in mind. I wanted clarification so I called up one of the senior members of that Committee. I said, "Is this your title, 'Students Who Fail?'—What do you have in mind here?" My friend laughed. "That's not my title, students don't fail." So I said, "Oh, that's true, so they don't." When I went home I met with another educator I respect, a man who has been retired for ten years after 40 years in education. He said, "What's new in the City University?" I replied, "Our Conference." He said, "Oh, let's see the program." He looked at the program glancing over it very quickly and said, "Wait a minute! What kind of title is this?—'Students Who Fail'—Students don't fail." So I have the corroboration of experience. I said, "That's right, we'd better re-think the focus of this Conference. Maybe we should look at what we're doing in terms of our progress, and the relation of failures as we build toward success." So let me cite for us those areas where we can feel some justified pride in our achievements. For example, our First Conference went outside this university to seek out experts to tell us what we could do. And our Second Conference brought in a number of specialists to address us. Today, with our Third Conference, you will notice that most of our workshop leaders come from within the University itself. Three years ago Vice Chancellor Healy remarked that we may be the only university in the country that talks to itself. Today, he is certainly correct. After four years we are at last in a position to talk to ourselves with relevance. We should be. We have learned by our experience. Today, our workshops contain model programs in the basic skills—reading, writing, mathematics. Today our Conference offers models of interdisciplinary planning and new and individual approaches to what by now are old problems. If we know too today that we have much to achieve in placement, testing and assessments of strengths and weaknesses of students entering our programs, we also know that we have progress to show. We think our advance is solid but we are resolved not to forget a guiding principle of this Conference as it was articulated by Dean Ballard at the very first Conference in his moving charge. He suggested that although we may disagree, we should not become angry with one another. Rather, we should talk and produce vital programs in cooperation with one another. He also said of the faculty of delegates at the First Conference on Open Admissions that in the room that day were the converted and the unconverted. We have changed since then. Today there is no more division. There are neither converted nor unconverted here. Today our Conference is for a whole university.

Thank you very much.

David M. Keller
Conference Director

The Charge to the Conference

Thank you for coming to join us during these two days.

I have spent the past three years evaluating the Open Admissions Program at the City University by visiting each college to look at how the program has been implemented. For the first four years of Open Admissions we, all of us, faced enormous problems, the simplest of which was finding room for the thousands of students who would not have been admitted to the University prior to 1970. We still have not solved the space problem. But we have progressed to the point where we have a better understanding of the educational issues. Perhaps the highlight of the year is this conference, where we can come together in an honest and open atmosphere to share the real issues confronting us in Open Admissions.

Even though we have now had several years of experience with Open Admissions, none of us has developed an optimal educational program. Some components of a sound program exist. And as for the others, we are at least in a position now to know what is missing. What we must realize is that we are still in the process of improving on what we have accomplished, and of developing what we need.

In looking at the various college programs over the past several years, I cannot help but feel that none of them is more than an adequate approach for the remediation of underskilled students. For this reason I have been trying to enlist the assistance of faculty in all the academic departments in the development of an academic strategy—of a more complete program—that will give us the opportunity to make Open Admissions a success. Although our progress has been slow, we have been moving surely in that direction.

Another issue that has troubled us in recent years has been the question of student performance. One measure of our progress under Open Admissions is that we can now realize that student performance is not necessarily a reflection of student ability, but rather of the appropriateness of the academic environment for student needs. It is time for us to admit honestly that a good share of the responsibility for students' failure has been ours rather than theirs. Those students who have failed are those we still have not learned how to teach.

Unfortunately, we in the CUNY Central Administration have little access to our own students except through the negotiations we have with your administrators, who then communicate to you and to the students. It is my hope that I can enlist the faculty in helping to develop an approach that will work, but moreover one that will be acceptable to all of the colleges. This conference, by providing an open and frank atmosphere, will contribute to the sharing we need to move toward our goal.

Thank you for coming. By sharing our ideas, our failure and our successes, we will be able to develop and implement better educational programs. I appreciate greatly your contribution to this effort.

Leslie Berger
University Dean of Academic Evaluations
and Executive Coordinator of the Conference

Plenary Session

PRESIDENT LEON M. GOLDSTEIN
Kingsborough Community College

President Goldstein: I'd like to welcome you to the Third Annual CUNY Conference on Open Admissions. I know that this conference will be as good, if not better, than the previous ones held here.

On July 9, 1969, the Board of Higher Education of the City University of New York promulgated a new admissions policy commonly referred to as the Open Admissions Policy. It probably is the most far reaching single educational advance in the twentieth century. The plan made the following provisions: admission to some university program to be offered to all high school graduates of the city, remedial and other supportive services for all students requiring them, maintenance and enhancement of the standards of academic excellence of the university colleges, ethnic integration of the colleges, student mobility between various programs and units of the university, continued admission of all students who would have been admitted to specific community or senior colleges under past admissions criteria.

To anticipate and plan for the action that would be necessary to make Open Admissions a success, college-wide committees on Open Admissions were formed and they continue to be operative. Such matters as space utilization, scheduling, student orientation and placement, remedial courses in mathematics, reading and writing, counseling services, the grading systems, retention problems, registration procedures, financial aid problems, faculty recruitment and many other factors were and continue to be considered.

Initial reactions to the new policy on campuses varied widely. While some faculty members viewed Open Admissions as an extraordinary social advance, some faculty members were concerned with the effect upon admissions and upon the quality of education that would result in a lowering of admissions standards. Supporters of the policy saw no threat to the quality of education offered by the colleges so long as course standards and degree requirements were maintained. The approach to Open Admissions must be based on the assumption that academic standards would not be lowered, that it is possible to improve student skills in reading, writing and mathematics upon admission to the colleges. This conference will deal specifically with the problems of reading and writing and mathematics. One of the foremost proponents of Open Admissions has been our Chancellor. He has been in the forefront of advancing Open Admissions internally and externally and it gives me great pleasure to present to you our Chancellor, Robert J. Kibbee, who will give greetings to this group. Chancellor Kibbee.

Chancellor Robert J. Kibbee
City University of New York

It is always a pleasure for me to meet with my colleagues of the City University, particularly when our meeting together is an opportunity to learn and to evaluate matters of common concern to us all. This Conference, the Third Conference of the City University on Open Admissions, is indeed such an opportunity to take stock of the results of our work together in Open Admissions for a period of over four years. And, as we take stock of the past, we can lay down probable guidelines for our future.

Year by year, the directives and the goals of our unique and ambitious programs of Open Admissions become increasingly clarified. What was for us at the outset a desire and a hope becomes a more solid objective each year. Our increasing experience reveals what we have achieved as it reveals what needs to be done in the immediate and in the more distant future. *A priori* estimates of what we desire to accomplish are usually easy: in the final analysis the only basis for solid advance must recognize the overriding importance of experience. Through our experience we reach a new vantage point that becomes in turn a new point of departure for advances to new goals.

Nevertheless, experience without evaluative judgment is as useless as judgment without experience. Evaluation is essential for any positive action and evaluation requires a realistic interpretation of the elements that make up our experience.

The City University today has an opportunity to unite these two. Obviously, neither experience nor evaluation are of particular value outside the context of the dimension of time. To make any rational judgments, time in which experience has been gained, and time, in which experience has been evaluated, is an essential element. The City University now has had four years in which to learn and to evaluate. These four years have not been wasted. Year by year, the University has had an annual stock taking, the Annual Conference, and upon this series of milestones the directions in which we move have become progressively more clear.

Thus, for the University, the significance of this Conference is that it becomes an unparalleled opportunity for evaluation. Our yearly Conferences give us a tool by which we may evaluate ourselves with increasing solidity. We have the experience that allows us to press forward, to sharpen our directives to revise our drives—all in order to achieve more fully the goals with which we began.

As I see it, this Conference has a 3-pronged objective. First, we need an even more sensitive mechanism of assessment. We have a great deal of valuable experience as to entrance placement for an entering student. We now can apply individual criteria to the individual student with a greater certainty we have the right place for each entering student. Again, our criteria are tools to evaluate better programs designed to develop student strengths. The sum of these approaches is that we now have developed a fund of knowledge whereby we can give a specific student what he needs. Thereby, our over-all programs are more realistic and more effective. And, to encourage us, we know there is always room for improvement.

The second prong of our directive for the Conference is that our specific methodology is more refined. When we better evaluate our students for placement, this means we have an unobstructed opportunity to evaluate the specific role of teacher to student. This applies, not only to general curricula, but to the relevance of the individual classroom to the larger curricular structure. Increasingly, this appears to be one of the great goals of Open Admissions now within our reach.

The third prong is one which is really exciting: I refer to the very real probability of interdepartmental cooperation. As our Program of Open Admissions continues, it becomes ever more evident how stultifying a policy of rigid departmental compartmentalization can be. In the new context engendered by Open Admissions, we see increasingly clearly that education is truly human experience, and that educational disciplines exist for men to use. If we, who generate and administer our programs recognize that their boundaries are fluid, by that same token, we recognize their common humanity since education worthy of its name is directed to the whole of every man and of every woman. Experience in Open Admissions shows clearly we are learning that we face a revitalized and human education and that our learning opens new and renewed perspectives. Our previous Conferences have taught us a great deal, and this one, too, should add to our knowledge and to our understanding.

Let me conclude with a personal word of appreciation. We all know we live in an imperfect world, that we have difficulties still unsurmounted, and can expect new ones to develop. Nevertheless, let me assure you again how much it means to me to realize we work as colleagues in an endeavor every teacher, by definition, holds dear. We are applying our intelligence, our skills, our patience, to open doors to light for those who want to see. Thank you very much.

Using the Students' Affective Resources to Develop Cognitive Skills

ELAINE AVIDON
CAROL SCHOEN
JAMES VAUGHN
Department of English
Herbert H. Lehman College

Since the advent of Open Admissions a steadily growing number of entering freshmen have been placed in remedial writing programs. At Lehman College in the fall of 1973, approximately 30 percent of the students were enrolled in such courses. As numbers grow, so does our awareness that many of these compensatory programs are not doing the job for which they were designed. Clearly documented reports show that the results of remedial programs are at best questionable. Research extending back over the last 10 years and surveying many colleges reveals remediation has done little to alleviate failure and early exit from these schools.[1] And, as teachers of remedial writing, we have seen failure in our courses extends to other areas of the student's work. If a student cannot write for his remedial composition class, it is probable that he cannot write for history class, physical education class, nursing class nor for any other discipline.

In the process of teaching our remedial courses, we have come to realize that too many of our students do not respond to traditional methods of instruction. Initially we began with a highly structured "drill and grill" approach to teaching composition. We focused on what we felt the students did not know and what in a very short time they had to learn. Within a few semesters, we discovered the rigidity of this head-on approach was demoralizing to the student's sense of self; consequently the student learned little in his thirteenth year of education. At this juncture we shifted our approach in the direction of "urban relevance." This was a strategy designed to reach the student via material we assumed would interest and motivate him, and within a semester serve to correct the grosser weaknesses in his writing. Although more student oriented than the previous "drill and grill" curriculum, this newer method naively assumed interesting writing to be a natural outgrowth of interesting reading. Despite the shakiness of this assumption, we did see an improvement in students' writing skills, and began to feel we were on a surer path.

Still dissatisfied with the results, however, we determined to reassess our methods. We were aware that while conventional modes of teaching might be successful for students who came to college with some record of success in high school, the remedial student had made little progress in the high school environment. This awareness, sometimes overt, sometimes unconscious, was the motivation for our submission of our course to further change. We redefined our goals; we sought new classroom strategies; we discarded texts and eliminated grades. In short, we aimed at all manner of innovative techniques, some of which we abandoned voluntarily because they actually didn't work or because we lacked the equipment and materials to make them work. We know that volumes have been, are being, and will continue to be written explaining why some students do not respond in a given learning situation, but until we can arrive at a definitive statement, the teacher of remedial composition faces the fact, every day in his classroom, that conventional procedures do not work.

At this point we realized we needed to reassess our definition of educationally relevant student characteristics. In the past the student had been defined only in terms of cognitive failures. Our redefinition of the student takes into consideration not only cognitive needs, but also those affective qualities that strongly influence attitude toward classroom and self-image. Research has shown and we ourselves have seen that there is a significant correlation between academic self-concept and academic achievement,[2] and we are convinced that only when both these aspects are given sufficient emphasis will remedial students perform at the level necessary for successful completion of a college education.

While, for the purposes of discussion, we are accentuating the division between thinking and feeling, basically these characteristics are inseparable. As Jean Piaget has said:

> This. . .will seem surprising only if one attempts to dichotomize the life of the mind into emotions and thoughts. But nothing could be more false or superficial. . .Of course affectivity is always the incentive for actions. . .since affectivity assigns value to activities and disseminates energy to them. But affectivity is nothing without intelligence. Intelligence furnishes affectivity with its means and clarifies its ends. . .Intelligence thus neither begins with knowledge of the self nor of things as such but with their interaction.[3]

In other words, all learning involves both affective and cognitive characteristics. Heretofore, this correlation has been largely ignored, but we believe that the remedial composition classroom offers an excellent opportunity to integrate them in an overt and structured manner. The inclusion of affectivity in the curriculum, however, should not be interpreted as an attempt on our part to become therapists for the student. It is included only as a means to achieve better learning. Our concern with affective needs is only appropriate to the extent that it is relevant to the learning our students need and to the classrooms in which they are participants.

In attempting to assess the characteristics of the remedial student, we have discovered that for 11, 12 or 13 years of his academic life he has been presented with an image that emphasizes his inadequacies.

It is no wonder that the remedial student has been characterized as one with an "academically squashed ego"[4]—for the student has come to expect failure and it is with this internalized expectation of failure that he meets each new learning experience.

While we know from first-hand experience that these students may be bright, lively, vibrant people, we also know that, as a result of prior learning experiences, much of their genuine radiance frequently is concealed. In a recent study done at Queensborough Community College remedial students' characteristics were thus described: "...students had a low image of themselves. This was demonstrated by a variety of self-deprecating remarks(i.e., 'I'm such a dope,' etc.), by extreme

reluctance on the part of the student to admit to not understanding a point made by the teacher, by inability to handle even a minor *faux pas* without an obvious display of shame, by a quickness to give up on a problem as being too difficult if the solution was not readily seen."

The truth is that these students have adopted a protective armor of overt distancing strategies; that is, they do not trust us nor themselves nor the possibility of education so they create an emotional and intellectual demilitarized zone to protect themselves from the teacher and the curriculum. Although this may serve to protect them as individuals, such strategies severely limit the students' ability to profit from education. Such defensiveness leads to compositions without authentic thinking and feeling for these students experiment neither with language nor with awareness. Their writing is empty of life and experience; they substitute the cliche and the superficial, the hackneyed and the plagiarized thought line. Small wonder their efforts so seldom please their instructors.

We were fortunate that, while we were rethinking our approach, the English Department at Lehman also was redefining its course sequence. The net result of our combined efforts was a 3 semester sequence for Freshman Composition, 2 semesters of which are required for all incoming students not qualifying for an exemption from the first half of the course. The course we shall talk about today is the first course of that sequence and is intended only for those students who score in the lowest fifth on the ACT. It is a 6-hour, 2-credit course, taught by members of the Academic Skills Department, with its objective to raise the student's level of performance in writing through a system of study stressing an experiential learning environment. Our course considers equally students' affective and cognitive characteristics. Strategies for transforming the student's self-image as an academic failure are combined with studies in language and usage appropriate for college work.

Affective Objectives: To strengthen the student's academic self-concept to enable him to participate confidently in educational experiences.

Cognitive Objectives:

Voice: We seek to develop the ability to communicate thoughts on a given subject both verbally and in writing. This ability derives from the student's sense that his perceptions have been recorded honestly and lucidly.

Grammar and Usage: We hope to train the student to use language appropriate to each writing experience. Emphasis is on the sentence as a unit of thought.

Form: We emphasize the ability to shape thought into logical written patterns. Students will be involved in experiences stressing the value of unity, coherence and clarity, and they will learn economy sharpens the force of one's perceptions. The paragraph as a formal unit of the expository essay is emphasized.

Approach: The approach is one which thoroughly correlates language learning to strategies for reducing the student's negative academic self-concept. A primary concern here is to make the student comfortable with writing. The focus for the first seven weeks is the student and his relationship to the group. In this segment of the course, we introduce experiential learning exercises to help the student gain a better awareness of self and relationships with fellow students and the instructor. We believe these exercises stimulate a sense of solidarity with other students and increased self-respect. After the first 7-week period, we begin to add other sources of learning from written, visual and oral media, taking care not to lose the student- and group-centered approach that characterized the opening section.

In conjunction with these strategies for affective learning, we incorporate materials dealing with cognitive needs. All experiential learning exercises are followed up with assignments in which the student puts his thoughts down on paper so that writing becomes an habitual and accepted mode of action rather than an occasional and frightening experience. Discussions are geared to help the student realize the need for depth and documentation in writing. Moreover, in keeping with our general approach, we stress appropriateness of usage rather than the teaching of grammatical rules. To deal with mechanical items which, for one reason or another, the student has not yet learned, we use a peer-mediated system to strengthen assurance that he is capable of handling his own learning, and to enforce the recognition that learning is the student's responsibility as much as that of the instructor. The instructional material itself develops ideas that grow from the experiential learning strategies until the grammatical experience is not only relevant to the classroom experience, but also strengthens the concepts which the experiential learning attempted to convey.

We have developed a series of exercises that we use during the first, or experientially-based, module of the course. Its functions are: (1) to make students comfortable with their peers and to build group cohesiveness; (2) to help students to recognize their own capabilities; and (3) to lessen student tension during writing and to establish writing as both a normal activity and a valuable tool.

We do not present this course as a final answer to the problems of remediation. All of us at CUNY are grappling with the problems of teaching these students, and all of us are concerned with the need to find techniques that will help a larger percentage of them. Our ideas seem fruitful to us and may be helpful to you.

FOOTNOTES:

[1]Over the past ten years there have been numerous studies attempting to assess the effectiveness of college remediation by comparing students in remedial courses with students who should have been placed in them but were not. It was found that traditionally designed compensatory courses have at best a modest effect on subsequent performance. More often results indicate: no higher scores in reading and writing, no meaningful reduction in college withdrawals, no effect on student satisfaction or performance; no higher achievement in social studies, humanities or English. In a survey of twenty such programs, the summary statement reads, "the effect of these programs on students' subsequent educational accomplishments is questionable." For further information see John Losak, "Do Remedial Programs Really Work?" **American Personnel and Guidance Journal**, 1972, 383-386; Amiel Sharon, "Assessing the Effectiveness of Remedial College Courses," **Journal of Experimental Education**, 1972, 60-63.; A. Hurlburt and J. Roueche, "The

Open Door College, The Problem of the Low Achiever," **Journal of Higher Education,** 1968, pp. 454-460; and two studies by John Roueche, **Salvage, Re-direction or Custody?** and **The Junior College Remedial Program.**

[2]R.M. Brooks, "The Self System: A Sociological Analysis," **Catholic Counselor,** VIII (1963), 27-30. M. Lowther, "Academic Achievement and Self-Esteem,"**University of Michigan School of Education Bulletin,** XXXV (1967), 7-11. Henry Olsen, "The Effects of Compensatory Education upon the Self-Concept-of-Academic-Ability. . .of Black and White Pre-College Students," **American Educational Research Association,** 1971. Wilbur Brookover and Edsel Erikson, "Introduction," **Symposium on Self-Co cept and Its Relation to Academic Achievement,** Chicago, 1965. James Coleman, **Equality of Educational Opportunity,** Washington, 1966. R. I oth, "The Role of Self-Concept in Achievement," **Journal of Experimental Education,** XXVII (1959), 47-56. J. Pietrofosa, "Self-Concept: A Vital Factor in School and Career Development," **Clearing House,** XLIV (1969), 37-42.

[3]Quoted by David Elkind, Introduction to Jean Piaget, **Six Psychological Studies,** New York, 1967, p. xxi.

[4]Unpublished study, "Report on the Spring 1973 High School Remediation Program" by Vita Tauss.

[5]Michale Kressey, "The Community College Student: A Lesson in Humility," **College English,** (1971), 772.

The Writing Center

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The first 3 years in the life of the Writing Center were an exploration of large scale tutoring in writing. We found that students respond to and are helped by tutoring, both in individual and small group sessions, and that peer tutors can be effective, if trained.

The training of the tutor, therefore, is our main activity. Training begins with an interview with Santiago Villafane, who lets the prospective tutor know what his problems will be and what we will expect of him. In these interviews Santiago is probing beyond credentials for the qualities, the attitudes, the experiences that are essential for effective tutoring.

Training is continued in the presemester orientation. This year's orientation consisted first of a guided tour through the Writing Center to explain its procedures, modules, records, files, and included interviews with the Center staff. As they gathered that morning, the tutors examined their copies of the **Tutors Yellow Pages** and chatted with each other. Then the tours, led by experienced tutors, began.

A videotape of the tour was shown .

The tour ended in the Rap Room for a discussion on the tutoring process. It was just about then that preparations for the demolition of Lewisohn Stadium began, and we had severe competition from a pneumatic drill. So we have had to delete several portions of the tape, and some of the remaining sections are not too clear.

I began the discussion by suggesting that the tutoring process is a complex one involving more than the knowledge of grammar and writing. In the ensuing discussion, we touched on four problem areas: the student's attitude toward himself and toward writing; the tutor's handling of questions when he is not sure of the answer; the relations between teacher and tutor; the question of dialect. Here are a few snatches from what we were able to salvage of the discussion.

The videotape continues.

Orientation was continued the following week. Each tutor spent 8 hours in the Writing Center going over textbooks and modules with the help of experienced tutors. The modules are brief instructional units in grammar and writing skills, created for the most part by the teachers assigned to the Center. A few of these are on display. The tutors spent some of this time consulting with Bill Mitchell and getting acquainted with audiovisual equipment and what we have in the way of software. Also on display is **The Living Sentence,** a 12 minute sound/slide lesson on the sentence and how it works.

A portion of The Living Sentence was shown.

These materials, whether or not used in sessions with students, help to prepare the tutor. Training is continued throughout the semester in several ways. The teacher on duty during the tutoring hours answers questions before, after, and even during tutorials. **This Week,** a weekly newsletter, edited by one of the tutors, provides information on new procedures, program changes general problems, and occasionally features a bit of grammar gossip. In-Class tutorials, an experiment this semester, provide another kind of training. The tutor learns something about classroom techniques. In the weekly seminars, tutors discuss problems encountered in working with students, share techniques, investigate grammatical problem areas. And the videotorials—our name for taped tutoring sessions—help the tutor to see himself as the student sees him.

A sample videotorial was shown.

It sounds, I know, as though we spend more time on the tutors than on the students. But if Santiago's radar is in good working order in the interviews, the time will be well spent. A good tutor training program multiplies considerably the number of students who can be helped, provides training for many who plan to teach, while recruiting others who discover their interest and aptitude, and brings together in friendship and understanding the academic haves and have nots on the campus.

The "Interdisciplinary"—Trivium and Trivia for the Freshman Class

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"Interdisciplinary." There's no such word. It's an illegitimate, a hybrid, an example of educator's jargon—number 8 in column 1 on the "Instant Jargon Generator," the **London Times' Guide to Gobbledygook**, reprinted in the October **CUNY Courier**. "Interdisciplinary" is a polysyllabic Latinate concoction, speciously suggestive of substantial things. It's a heady word—the whole seems greater than the sum of its parts.

Although the parts of the word "interdisciplinary" compounded would indicate "disciplines combined," many so-called interdisciplinary courses seem to be no more than loose juxtaposition, a laying side by side of related subject matter for separate but equal opportunity in the classroom. Of course, it doesn't matter what a course is called—there can be valid juxtaposition, exciting, carefully delineated territories covered separately by specialists acting either alone or as a team, working with one class or in a program. The name of the course is not important because "interdisciplinary" is often used simply to attract a clientele.

It also doesn't matter how the course is arranged because the real success of any class depends upon the teacher.

Those who teach best, who have an appreciable effect on how their students think and feel, do so because they are magic-making people who, if removed from materials and methodologies, would work their alchemy wonderfully well alone. Still, not all teachers are magicians who can turn it on all the time and there are also dangers attendant on a cult of personality.

The current craze for interdisciplinary experiments suggests that teachers want programs and courses to have magic too. An Open Admissions policy challenges traditional modes, causes mutual consideration of psychological and academic needs, and tends to emphasize basic skills at the expense of knowledge in the liberal arts. Again, some faculty interest in the "interdisciplinary" idea is probably a response to declining enrollment in the humanities. At the first City University Conference on Open Admissions, Professor Walker Gibson exhorted all teachers to look to the "interdisciplinary" course as the new and necessary mode to stem the tide. "...we are going to be seeing new ways of teaching literature, literature and politics, literature and psychology before we are going to regain that large, popular faith in literary studies that many colleges until recently enjoyed." Although some teachers may want to participate in "interdisciplinary" programs in order to push their own electives, most teachers do seem to care about helping freshmen.

A sufficiently varied package, some think, is bound to attract someone, some time. Others support "interdisciplinary" programs for what they see as distinct psychological advantage: in travelling as one class to teachers instructing differing subject matters, all of which are related, students gain from reinforcement and familiarity. The idea is to create a common foundation that supports the underprepared. Still others support "interdisciplinary" programs as advantageous academically both to students and to faculty by reminding them that knowledge is not a discrete enterprise and that "English" is not a discipline apart from content.

"Interdisciplinary" as method or goal, juxtaposition or mutual influence, seems to have noble-minded adherents, but good intentions are no substitute for the requisites of experimentation: definition, control, evaluation. In many colleges where interdisciplinary courses are offered at freshman level, it is not always easy to find a clear statement of purpose, a syllabus that shows a method, or a faculty member who can offer a cogent rationale. Some people obviously believe the word is self-evident.

It is important to know from those who teach in interdisciplinary programs what disciplines they link and how and why they are linked. In some cases mere juxtaposition is enough. In others, a faulty premise may work against a good idea. In urging acceptance of interdisciplinary experimentation, Professor Gibson suggested that "the conventional historical program of literary research may not be exactly what the human condition needs most in the last quarter of the twentieth century." It is a questionable hypothesis which, on a senior level, might lead to lively debate, but which, on the level of freshman English, well might be disastrous.

Although it is fashionable to criticize the system and enjoy the sense of going against the current, faculty are not salmon. They should try out their experiments in all currents. The professional world includes not only daring innovators who may be wrong, but skilled and well-intentioned reactionaries who may be won over or offer good revisionary advice. Interdisciplinary enthusiasts should measure theirs against the goals of those who teach the traditional disciplines.

A recent Modern Language Association survey which had asked about member interests, turned up what the MLA Executive body described as a "surprising statistic"—"...in spite of all one reads and hears about interdisciplinary studies and 'culture' courses, only 2.10% of the members described their scholarly interests in terms of 'Literature and Other Arts and Disciplines.'" The overwhelming check-off was for the "traditional bounds" of country, period and genre. What should be even more surprising, however, and sad, was another statistic: "...although the vast majority of [MLA] members are of course involved in teaching, [they] do not rate pedagogy highly among their 'scholarly interests.'" Only 3.21% indicated that they were primarily concerned with "teaching methods or materials." Some conclusions for interdisciplinary enthusiasts can be drawn from this information:

1) Although they care, many teachers of composition, schooled to teach literature, may succumb to an interdisciplinary course because they think it will allow them to revisit familiar and perhaps preferred territory. Inadvertent exercise of this preference, however, brings the temptation to slight basic skills, and if the interdisciplinary course is a substitute for the one required course in basic composition, the temptation, if

realized, is sin.

2) Although the experiment of merging disciplines may go well, in the opinion of those involved, for reasons of fair play and status the course should be reviewed in some way by other members of the disciplines, and especially by those who would be in a position to encourage its extension. Prestige attracts. Hopefully, those attracted by a course that "works" might be the "literature" people who could bring years of knowledge and experience to a course in composition and bridge the division between the literature and composition factions. Probably no other course in the entire college curriculum needs the senior teacher more than freshman composition. Ideally, the freshman interdisciplinary should be a fusing and a condensing process, a relating of subject matter and form. Faculty experienced in the art of their own discipline would take special care to respect the form of another. They would participate in an interdisciplinary course. That course could be enriched with visionary skills. Well-meaning, but inexperienced enthusiasts, on the other hand, may not know how to avoid the lures of contemporaneity and overlap. The English teacher in an interdisciplinary course in composition should not become only a **Fairbrace Handbook** custodian.

3) The hesitation of some respected senior scholars concerning interdisciplinary courses should not appear to the already committed as disdain. Serious teachers know that an interdisciplinary course requires more work than a regular one: more pre-course preparation, more reading of papers and exams, and more conferences with colleagues on the development of their design. Some administrators may fear the real cost of an interdisciplinary course, but many faculty feel it would be costly to the soul.

Excitement about the goals to be achieved by the interdisciplinary course should not excuse poor coordination and inadequate pre-course planning, especially when team-teaching is involved. Without clear definition of the course and differentiation of areas of authority, students will be confused by conflicting points of view and by discrepancies in grading standards. It is not enough to offer an interdisciplinary course and say that it will "stimulate" the students. English teachers work in schools, not massage parlors.

For teachers of composition who want to use an interdisciplinary method to achieve a goal, the goal ought to be stated as more than psychological adjustment or better attendance. It should reflect, first of all, the placement level and secondly, the competence required for future work. Well-intentioned teachers who cannot define an academic goal deal in trivia. Most schools have support services in advisement, counseling, and tutorial writing clinics. The interdisciplinary course, for all its desire to liberate or soothe, must also show success in teaching exposition and persuasive discourse. The ultimate goal of any interdisciplinary course should be the discipline itself.

"Discipline" is a hard word. It means training, exercise, skills for corrective purpose. It suggests punishment, cleansing, prescription. It aspires to teach conduct and right action. Its rhetorical definition is not unrelated to its etymology. A discipline in rhetoric is an art, an order, a form. The trivium, the master rhetorical form, is the master interdisciplinary discipline, uniting grammar, rhetoric, and logic. Renaissance humanists held it to be the form of forms, the discipline most necessary for free men and women who aspire to the Liberal Arts. There may be lessons here for interdisciplinary teachers who face underprepared students who have never cultivated even the discipline of going to school.

Logic and Semantics are common to all subjects and emphasize form. The logic of consecutive reasoning and the logic of passion are both part of the Rhetoric of Logic, of the essential idea of appropriate discourse underlining all disciplines in Western culture and their expression as events in time, as imaginative prophecies, or as systems of discovery. There are grammars of motives as well as of scientific procedure, paradigms of verbs as well as of revolutions. The trouble with many interdisciplinary courses is too much matter, too little form. We need to begin again with the Word.

Approaching the Extraordinary

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I am appalled by the way most teachers speak and write. It is bad enough that students pick up the jargon of their science and social-science classes, but it is unforgiveable for English teachers to sound like half-baked sociologists. In a series of discussions that preceded this Conference, the only authors I heard mentioned were people who had written research articles. The conversation was full of verbal garbage—"in the context" of this, "in terms of" that, "in the framework" of something else. As a group of English teachers, all of whom presumably read, love, and have taught literature, we sounded like semi-literates.

Have we given up on literature? Is the study of writing meant only to help young people compose a job application or write an examination in history?

I realize there are CUNY English teachers who fret because they can make no headway by returning to their old college notes to explicate symbol and myth in Milton, Melville, and James; and I have no sympathy for them. But exercises in reading and writing should go well beyond the imposition of grammar, spelling, and punctuation. Learning to read and write is, or should be, a pleasure; mastering these skills enables students to become more sensitive, thoughtful, and expressive citizens. Anyone who doubts this should not teach English. Literature is more than hammock-reading for aesthetes. It accumulates and distills wisdom by telling us how people have lived, and how they live today.

We hear constant talk about the need to do more research. For what? We are chart-ridden and constipated with statistics. A truism: students will not learn to write unless they become familiar with what has been written well. They need opportunities to feel inspired. Mere language is a blunt tool; when used as a musical instrument it offers an infinity of services.

The theatre—seeing and hearing plays; not simply reading them—can facilitate the teaching of English. It invites students into strange new worlds; it introduces them to characters, situations, and settings they would not otherwise have dreamed of; it illustrates how ideas, feelings, and moods can be transmitted through speech and silence. The theatre demonstrates eloquence and stammering, formal correctness and the vitality of contemporary slang, false rhetoric and words spoken from the heart. It is literature in action.

I don't claim the theatre encourages a spectator to "identify" or "empathize" with characters. **Rosmersholm, Hamlet,** and **The Homecoming** will probably not make one feel like Rebecca West, a Danish prince, or Lenny the pimp. Rather, they expose students to concentrated passions that lift them out of the sluggishness of an ordinary existence.

Teaching tries—or ought to try—for the same results. The classroom is a coop unless it provides glimpses, and an occasional experience, of the extraordinary.

Workshops in English as a Second Language

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The 1973 Third Annual Conference of the City University of New York had many firsts: (1) the first time that CUNY faculty handled *all* aspects of planning, running, and following up the English as a second language (ESL) workshops, (2) the first time that six workshops were devoted to English as a second language, (3) the first time that many ESL faculty and administrators gathered to discuss programs, to share ideas, and to initiate cooperation and cross-fertilization among the ESL components on the different campuses in the City University.

Approximately 125 ESL teachers and administrators from more than eighteen campuses within CUNY participated in or attended the workshops.

It is commendable that the planners of the CUNY Conference acknowledged the existence of and utilized the vast expertise and experience of CUNY faculty and administrators in ESL programs throughout The City University. Since the overall theme of the Conference was "Open Admissions," it was obviously the people dealing with CUNY students and their problems who were in a position to phrase suggestions and solutions. Contrary to the 1972 Conference where an outside private university program (having no knowledge of "Open Admission" frustrations and even having less academic preparation than CUNY faculty) was invited to participate, this 1973 conference presented pertinent workshops where CUNY faculty actively participated in and ran each workshop. Each workshop represented a definite area of interest for CUNY ESL faculty because ideas for them were solicited in the planning stages. These ESL workshops were presented *to* CUNY people, *for* CUNY people, and *by* CUNY people.

Workshop titles were (1) "Testing, Placement, and Exit Criteria," (2) "Teaching Composition to Open Admission Students," (3) "The Silent Way: Pros and Cons," (4) "Sequential Development, The Syllabus, and Textbook Evaluation," (5) "Reading Skills Instruction in English as a Second Language Courses," and (6) "Recent ESL Research."

This writer, in writing the proceedings of CUNY Conference III, chose the method of annotated reportage, that is, reacting to transactions as well as reporting them. I thank the TELC staff, David Keller, Joan Jeffri, Bob Lugton, and many others for their help. However, I alone am accountable for any distortions that might have occurred.

TESTING, PLACEMENT, AND EXIT CRITERIA

The members of this workshop panel briefly reported on testing and placement practices at their respective campuses: Diana Diaz from Hostos, Bobbie Gonzales from Borough of Manhattan, Martha Kornblum from Queens, and Robert Viscount from Kingsborough.

Various programs used specially developed or commercially available tests, e.g., the University of Michigan Test of Proficiency in English as a Second Language. The consensus seemed to favor tests that had already been item analyzed and validated such as the University of Michigan or other tests commercially available. There is the risk of possible compromise, however, if any one commercial test is used excessively in any program. A possible solution is to have a complement of item—analyzed and validated tests for alternative usage.

Placement designates the proficiency level to which a student is assigned based on his test scores. For placement, most CUNY ESL programs exhibited a need for several scores: oral production, grammatical structure, reading, and writing. Other programs—particularly full-time intensive programs in ESL—amplify the number of tests by including vocabulary and aural comprehension.

These tests are of two kinds depending on the participation by the student in taking the test. *Passive* tests require the student to select or recognize (versus produce) the correct answer from choices presented in the test. Obviously, passive tests prevent a student from using the language in a creative way, but, on the other hand, passive tests can be more objectively evaluated by teachers. *Active* tests allow for student variation and unique language usage since the student can produce his own subjective answer. The problem with active tests is to insure objectivity in evaluating the student responses. Many tests, however, do offer solutions to this quasi-lack of objectivity in interpretation since active tests can be authored to encourage students to exercise their abilities in logic or to respond freely in a teacher-controlled context.

Most of the tests that are now being used in CUNY ESL programs are passive; some programs have experimented with freer forms of testing in order to evaluate more accurately a student's real ability to use (produce) the language. Such tests are most prominent in oral production and writing. Other tests perhaps from necessity are restricted to the passive role of the taker. In any case, it seems very doubtful that any program would require either all-active or all-passive tests. The most successful placement results from mixing active and passive tests and meshing the results to arrive at realistic placement.

A novel testing procedure offering a great deal of production from the student is the cloze testing procedure as discussed by Dr. John Haskell of the University of Puerto Rico. Cloze tests are flexible and quickly composed. Any reading passage can serve as a cloze test; the process requires that every *n*TH word be deleted and lines of equal length are substituted for each deleted word. Dr. Haskell felt that fifth-word deletion tests yielded the most successful results. The student is instructed to write in the one word that he feels fits the reading passage. The teacher, in evaluating the cloze test, has a choice of what to accept as a valid answer: (1) only the **one** word that appeared in the untampered reading selection or (2) any one word that fits the context. The second choice allows for student variation and encourages students to juggle the passage in a number of meaningful ways. Yet, the problem of subjectivity enters again: some teachers might be disparate in the allowance of valid one-word answers. Consequently, it is a good procedure to run the cloze test a

number of times with native speakers to see what various entities can be placed in the blanks. Even so, the teacher should be open and utilize his own English-language intuitions to assess the grammaticality of a student's answer in view of the fact that each student taking the test might see the context in a novel way.

Just what a cloze procedure test is, is unclear. Certainly, this procedure allows students more freedom of interpretation and usage. It is very possible, true that cloze testing can reveal a student's awareness of underlying abstractions—if a teacher opts to allow any one word that is meaningful in the context. For example, in the sentence "John is a young ——who likes to ski. . . ," the blank can obviously accommodate a noun such as "boy," "man," "student." Consequently, if a student puts a suitable noun in the blank, the procedure reveals far more than his restricted knowledge of the one noun he supplied; the student is providing evidence that he understands the noun-concept, the frame where a noun can fit, and the structural coordinates that occur concomitantly with a noun.

It is apparent that more experimentation with cloze testing is needed and teachers should more fully utilize cloze testing procedures to get at students' **active** awareness of English.

Exit criteria designate guidelines for when a student ceases to be treated as "special" or "remedial" and enters the mainstream of regular college work. Exit criteria do not represent absolute measures. In fact, it seems that disparate criteria do exist throughout CUNY as evidenced by the varying programs offered for ESL students as well as certain needed programs that are not offered. At some CUNY campuses, an ESL problem is treated as stigmatically remedial; at other campuses an ESL student is simply a special student who has special classes. Further, there are undoubtedly many ESL-deprived students who are accepted to CUNY under Open Admissions standards. Naturally appropriate mechanisms should exist to deal with all these students. These mechanisms should be designed to (1) spot ESL-deprived students, (2) channel these students into a special program, and (3) intensively upgrade each student's ESL skills until he can meet objective exit criteria for entering regular college courses. If special practices with ESL students are not made more realistic, then CUNY's Open Admissions policies in fact become revolving doors that cruelly deprive many intelligent non-native speakers of English of an opportunity for an integrative and meaningful college experience.

TEACHING COMPOSITION TO OPEN ADMISSIONS STUDENTS

This workshop focused on innovative and ingenious ways of conducting composition classes for open admission ESL students.

This workshop was a product of the collaboration of talented personnel from four CUNY campuses: LaGuardia Community College (Gloria Gallingane), Bronx Community College (Irene Dutra), Hunter College (Linda Kunz), and Borough of Manhattan Community College (Jean Withrow).

At the inception of the workshops, all participants were divided into subgroups of three members each. Each group circulated to assigned writing "stations" positioned throughout the workshop area. Each "station" concentrated on a designated mission or restricted writing activity executed by each group of three. These missions, each focusing on a single writing performance goal, sparked a great deal of exchange and interaction among the members of the subgroup particularly since all activities were applicable to any ESL writing class.

An example of one interactional activity was roleplaying. Each member of the group assumed a role, that is, a part of an object like a coffee cup. One person stated that he was the handle, another the outside of the cup, and the third the inside of the cup. Each person pointed out the importance of his part and just how it must be integrated into the complete entity, the coffee cup. Peer discussion ensued, and the participants were then encouraged to write a composition citing and explaining the make-up of the coffee cup.

Perhaps this approach seems simplistic, but it is true that students become more capable of organizing a composition by forcing their concentration on theme—development and hierarchical entities in a composition. In other words, writing improvement is evident when students sharpen their own sensitivities through discussion and interaction with peers. Students are imminently capable of improving each others precision of thought, levels of organization, and theme development.

In summary, then, it was quite clear that improvement in the teaching of writing to Open Admissions students is a matter of (1) breaking down applied writing goals to focus on one operation at time, (2) massive but not mechanical writing practice, that is, students learn to write better by writing a great deal and regularly about experiential topics, (3) students' exhibiting an interest in the topic to be written about, (4) students' being allowed to exchange their ideas about the topic before and during the actual writing experience, (5) students' being motivated to edit their own and each other's writing, and (6) students' being allowed to individualize their own instruction by small group activities that are oriented toward a particular writing goal.

The leaders of this workshop definitely felt that their students showed marked improvement in their writing. Informal writing records were kept over a semester and students had decreased the number and kinds of writing mistakes they made. Yet, there was some feeling statistical quantification was needed in order to reinforce the validity of the above practices. Quantification would be very easy to establish; those teachers who have taught writing would simply tabulate the kinds and number of mistakes and compare these data at the beginning and at the end of a writing program. The enthusiasm demonstrated by the workshop leaders and participants certainly pointed up the vitality of these inventive approaches to teaching writing to Open Admissions students.

THE SILENT WAY: PROS AND CONS

Most ESL teachers in the New York area have known of the Silent Way for quite some time. Dr. Caleb Gattegno's method of motivating language learning has influenced many language teachers in CUNY and has provoked a

great deal of action and reaction. This workshop was offered as a sort of arena to air prevalent feelings regarding the "subordination of teaching to learning" in the ESL classroom.

Dorien Grunbaum of Borough of Manhattan Community College demonstrated the Silent Way by conducting a class in Dutch. In this short lesson, students, CUNY participants in the workshop, learned to understand, speak, read, and write a limited corpus of equational sentences contextualized around locatives ("under the book" "on the book"). Following the demonstration class the panel, all ESL teachers from CUNY, exchanged ideas concerning the effectiveness of the Silent Way. The panelists were Larry Anger of LaGuardia Community College, Rosamund Blanck of Borough of Manhattan Community College, Rosario Gingras of Queens College, Frank Scimone of Baruch College and Dorien Grunbaum, the demonstrator.

Foremost in the Silent Way classroom is the maximization of student participation in the learning process; consequently very little teacher modelling is recommended since the teacher's role is seen as one that ignites multifarious learning strategies. Such strategies utilize the student's (1) tacit awareness of language **in general** (perhaps a demonstration of the existence of abstract language "universals"); (2) conscious or unconscious knowledge of language(s) **in specific** (for example, the syntactic arrangement of constituents and lexical similarities in Indo-European, particularly Romance languages); (3) ability to bring into play his powers of **analysis** to segment learning nuggets of language such as phonological and morphological units, syntactic arrangements, and parts of speech or lexicon (to the point that even in an unfamilar stream of speech like Jabberwocky, the student can pick out the working and repeated units of language); and (4) capability to create **analogies** by generating structurally similar (NP+VP) but semantically different utterances ("stars shine," "lions roar").

All language students undoubtedly possess these language learning strategies but in varying degrees of proficiency and for various reasons ranging from genetic predominance in the brain (verbal versus spatial) to a practical rustiness or unuse of these abilities in unsophisticated language learners.

Any productive language teacher is not only aware of these learning strategies, he actively incorporates the use of these strategies into his own pedagogy. The Silent Way is an effort for these strategies to be instrumented not only by the instructor but also by the learner in the latter's own acquisition process. Thus, the effective instructor's goal is not so much to have the student **receive** instruction as a baby is fed pablum; rather the instructor subtly and ingeniously uses various classroom procedures to shift the active role to the student. Such procedures include: (1) allowing class time for an individual student to work out a personal strategy for learning an entity (where the student often arrives at the correct response by trail and error and thereby establishes the validity of negative reinforcement in the learning circuitry); (2) peer activities ranging from modelling (if one student has "got it") to editing and correcting; (3) limiting lexicon in initial phases in order to focus on the language structural system. (Small wooden "rods" of different sizes and colors are often used to present a context for grammatical structures.); and (4) utilizing mnemonic devices such as fingers to signal word order or syllable structure.

Educational psychologists and some linguists are quick to point out that adults are better deductive learners than children and that children have a greater productivity with inductive learning. Further, induction in adults seems to be an ability that has diminished with time and experience as adults have become more proficient in deductive learning. However, both abilities reside in adult learners and the wise teacher tries to utilize both in the classroom.

This dichotomy of inductive and deductive learning pertains directly to the Silent Way because some critics charge that the Silent Way tends to be inductive and thus denies an adult learner expeditious use of his deductive faculties. In fact this charge stems from a basic misunderstanding of this classroom approach to learning. It is quite true that a "traditional" teacher, when in the language classroom, might prefer to teach inductively or deductively, but the Silent Way teacher simply presents the ingredients of the instructional unit and motivates the student to learn by contextualizing and by involving the learner individually in the process. It is up to the student, then, to devise his own learning strategies whether inductive or deductive. It is easy to label teaching as either deductive or inductive, but one can never be sure of what is happening in the mind of the learner.

In short, then, the Silent Way can be characterized as neither solely deductive nor solely inductive but can be either one at times depending on the learning strategies erected by the learner.

Other critics are dubious about the Silent Way because to the observer (but perhaps not to the participant), there seems to be an unexpeditious use of classroom time. Much teacher time appears to be spent in efforts to elicit new language items from "blank" students. This criticism is sometimes valid since a few Silent Way teachers have not extensively examined the learning theory involved; concomitantly they fear that any personal stylization of their own might taint the purity of, alter the validity of, or dilute the emphasis on student learning. Certainly any new approach to language instruction must be seriously appraised. Any teacher has to fully realize that dehumanizing language is no aid to learning. There are times in fact when teacher modelling is a *must*; there are times when a teacher could favorably acknowledge a particularly well-formed response. All these variations enhance the effectiveness and the humanity of the language learning process. For a teacher to obsequiously obey any method is pedagogical blindness. The Silent Way, like some other effective classroom procedures, is best used by an innovative, judicious, and sensitive teacher who confidently adds his own character to the class.

A healthy respect for the learner and what he brings to the learning situation is basic to the Silent Way approach. Our goal is to produce a language student who functions in the new language, a student who trusts his own strategies, a student who exhibits a performance based on a full realization of innate competence, a student who

does not fear making mistakes knowing that he has the freedom and the ability to experiment with the language. Language teachers have seen too many alternatives that have produced dysfunctioning students. The Silent Way should serve to remind teachers that without learning, there is no teaching.

SEQUENTIAL DEVELOPMENT, THE SYLLABUS, AND TEXTBOOK EVALUATION

This workshop was devoted to ESL instructional materials, both teacher-prepared for an individual program and commercially available from various publishers.

Certain criteria pertain to both special and commercial ESL materials and these same criteria should serve as guidelines in assessing the utility of materials. Perhaps the most important criterion for ESL instructional materials is sequential development of items in the syllabus. For the purposes of preparing an instructional syllabus, sequential development refers to the entry, (the initial appearance of a grammatical item) the re-entry, (subsequent appearance of a grammatical item for purposes of reinforcement) and the order of items on a learning spectrum.

Among teachers and textbook writers, there are differences of opinion as to where one should place a grammatical item on the learning spectrum. Some items seem obviously beginning level, other items seem just as obviously intermediate or advanced levels. There is much disagreement among teachers on the placement of these grammatical items on these learning levels.

There are many questions to be considered in preparing an instructional syllabus and materials. Some of these questions are:

1. Does structural simplicity automatically designate entry at a low level on the learning spectrum?
2. On the other hand, does structural complexity mean an automatic entry at a higher level on the learning spectrum?
3. Is there an intrinsic difficulty residual in a grammatical structure that would necessarily place it higher on the learning spectrum where more advanced students are supposedly more capable of processing this intrinsic difficulty?
4. Where does one enter an intrinsically difficult grammatical structure that has a high functional load, that is, a difficult structure that is frequently used among native speakers?
5. What balance can be established between grammatical presentation and sequencing on the one hand and functional load on the other (for example, the unmarked (regular) verbs in past simply add-**ed** whereas a high percentage of frequently used verbs are marked (irregular) for past tense due to internal vocalic change of some other irregular mechanism)? Does one puristically restrict his instruction and the syllabus to items that follow a general pattern or does one's instruction handle these marked items of high usage?
6. How does one mesh the entry and re-entry of related structures forming apparent hierarchies where a relatively simple structure is a part of a more complex one (for example, the verb **have** showing a relatively simple paradigm for simple present but forming a part of a more complex structure for the present perfect)?

Many rationales are at work in phrasing answers to these questions. Structural simplicity or complexity, as experienced ESL teachers know, does not respectively connote beginning or advanced levels on the learning spectrum. A fact of the ESL classroom is that some very difficult grammatical structures must be taught quite early because these structures are frequently used and serve as input for subsequent related structures. An obvious example is the verb **to be.** By the same token, some relatively simple structures, because of the rarity and precision of their use, must wait for advanced level presentation like, for example, the post nominal adjective in **I like my coffee hot.**

Another problem facing teachers and materials writers is the dichotomy of structure versus context. By preparing a structural syllabus, one necessarily assumes that a natural context must emanate from a structure but rarely the converse. However, great care should be taken to realistically contextualize a structure, one should be sure that the language use is not distorted or confusing. Teachers should think terms of meshing and sequencing not only structures but also contexts and of utilizing one context for various structures at different times if the context proves structurally fruitful. Further care should be taken to select a context without a confusing array of new lexicon since it is axiomatic that new structure should be taught using familiar vocabulary. Examples of suitable structure and context link-ups include (1) passives at a wedding **(The invitations were sent by the bride),** (1) causatives for routine **(I have my hair cut once a month)** (3) **Wh** — questions at a job interview **(What's your name?).**

In an effort to come up with some sort of consensus for the entry and sequencing of grammatical structures in a syllabus, Dr. Donald R.H. Byrd and John Dumicich of The English Language Center at LaGuardia Community College composed a two-part seventy-item questionnaire.

The first part dealt with forty major structures of high frequency and of varying degrees of difficulty. Using any criteria they chose, teachers were asked to place a check on a scale from zero to nine to indicate at which point on the scale the structure should be learned; zero represented very beginning and nine very advanced. Close to fifty ESL teachers took the questionnaire. By converting the assignments on the zero-to-nine spectrum to a contracted syllabus of five levels (one to five), the investigators were able to come up with a percentage consensus by teachers as to which structures make up each level. (see chart 1)

Chart 1 shows some structural items about which there is almost unanimous agreement as to their place in a five-level learning syllabus (90.7% **be** + complement). Some structural items, however, are not so clearly delineated (16.6%, 23.8%, 23.8%, 26.2%, 9.6% for lexical derivational contrast). This lack of delineation could be attributed to one of two factors: (1) basic disagreement among teachers or (2) unclear presentation of the structure in the questionnaire. The latter reason is most likely, probably due to the fact that some structural items were designed to incorporate various levels of difficulty.

The second part of the questionnaire contained groups of three sentences in which related structures occurred.

CHART 1

STRUCTURE	LEVELS				
	1	2	3	4	5
1. present continuous	90.7	9.3			
2. **be** + complement	90.7	7.0	2.3		
3. nouns: plural formation	83.4	11.6			
4. comands	76.2	18.7	4.8		
5. habitual present	65.1	27.9	7.0		
6. Wh-words and questions	62.5	32.0	4.7		
7. simple past	57.2	35.8	7.2		
8. pronominalization	55.9	21.5	2.4	2.4	
9. future: will	53.5	41.9	4.0		
10. adjectives: comparatives and superlatives	47.6	42.9	7.2	2.4	
11. mass - count	41.9	46.6	9.3	2.3	
12. simple modals	26.1	52.4	19.0	2.4	
13. order of adverbials	20.9	48.8	18.7	11.7	
14. adverbs: degree	11.7	58.1	25.6	4.7	
15. past continuous	9.7	61.9	29.3		
16. irregular verbs: past and past participle	13.5	62.1	24.3		
17. adjective: equality intensity	10.0	47.0	41.0	2.5	2.5
18. real conditional	7.2	45.2	40.5	7.2	
19. connected statements	23.7	38.0	33.3	2.4	2.4
20. request variations	12.5	40.0	22.5	15.0	5.6
21. present perfect	14.2	36.0	38.1	7.2	4.8
22. present perfect continuous	2.3	39.6	41.8	11.6	4.7
23. simple passives	2.4	38.1	42.9	11.9	4.8
24. infinitives	4.8	31.0	38.1	26.2	
25. frequent 2-word verbs	15.4	25.7	41.0	11.4	2.6
26. verbal variations	7.0	21.0	41.8	18.6	11.6
27. adverbial expressions	2.4	21.4	40.5	28.4	7.2
28. simple reported speech	7.3	19.5	43.9	14.6	14.7
29. relative pronouns		24.4	53.6	22.0	
30. adjective clause reduction		22.5	37.5	25.0	15.0
31. transition words	5.4	18.9	32.4	27.0	15.9
32. unreal conditional	2.6	14.6	31.7	41.4	9.8
33. complex modals		4.8	38.0	42.8	14.3
34. past perfect		4.7	27.9	48.8	18.6
35. complex reported speech		7.2	19.0	42.9	30.9
36. uninflected verbs			21.4	42.8	35.4
37. lexical derivational contrasts	16.6	23.8	26.2	9.6	
38. negative variations	7.0	23.3	13.9	25.6	30.2
39. double comparative	2.3	4.7	23.3	37.2	32.5
40. advanced tags		9.7	26.9	39.0	24.4
41. causatives		9.0	25.6	39.5	25.6
42. gerunds		4.6	23.3	39.5	32.5
43. pre-nominal order	2.4	23.7	11.9	26.2	35.7
44. cleft sentences	2.4	4.8	11.9	35.7	45.9
45. complex passives			15.0	37.5	47.5

The teachers were instructed to rank these three sentences in an order that they felt the structures should be learned. These related structures could or could not have occurred together in the prospective syllabus, but in either case each teacher ranked the structure that should be learned first, second, and third—whether directly sequential or not. An example of noun pluralization illustrates the procedure:

____ classes
____ men
____ desks

Using any criteria a teacher wanted, he would probably rank the noun learning sequence as:

2 classes
3 men
1 desks

Those ESL teachers who ranked the items as 2,3,1 exhibited some sort of logic like

1. **desk** + pl. = unmarked (regular) plural for voiceless consonant - final stem + s =/s/
2. **class** + pl = unmarked (regular) plural for sibilant-final stem + s = /iz/
3. **man** + pl = marked (irregular) plural =/men/

Assuming that markedness is less general, the teaching and learning of unmarked items would precede marked because general rules, for purposes of analogy, would be learned before specific exceptions to these rules. (**men,** of course, is a noun of high functional load and would thus be learned as early as the other two nouns but sequentially following).

Space does not allow a full presentation the results of the thirty groups, but certain structural sequences were highly favored by ESL teachers. There was notable agreement among ESL teachers regarding the following ten sequences. The number indicates the percentage of ESL teachers that preferred the subsequent sequence

1. Noun Pluralization
   90.5% :
   (1) car**ds**
   (2) pa**ges**
   (3) chil**dren**
2. Syntactic permutation for continuious action verbs
   83.3% :
   (1) **She's writing;**
   (2) **Is she writing...?**
   (3) **What is she writing?**
3. Negative adverbs/syntactic variation
   82.5% :
   (1) **I've never seen...**
   (2) **I haven't ever...**
   (3) **Never have I...**
4. Correlative rejoinders (negative)
   82.5% :
   (1) John **isn't**..., and Dave **isn't either.**
   (2) John **isn't**..., and **neither is** Dave.
   (3) John **isn't**..., **nor is Dave.**
5. Question types
   81.0% :
   (1) **Does he take the train...?**
   (2) **Which train does he take...?**
   (3) I don't know **which train he takes...**
6. Extra position and infinitive phrases
   80.0% :
   (1) **It's foolish to ignore...**
   (2) To **ignore...is foolish.**
   (3) **For you to ignore...is foolish.**
7. Adjective Placement
   75.6% :
   (1) The coffee is **hot**
   (2) **Hot** coffee is stimulating
   (3) I like my coffee **hot.**
8. Adverbial clauses **(while)**
   74.4% :
   (1) He tripped **while he was dancing**
   (2) **While he was dancing,** he tripped.
   (3) **While dancing,** he tripped.
9. Modals
   73.2% :
   (1) John **can** cook.
   (2) John **has to** cook.
   (3) John **ought to** cook.
10. Conditional
    71.4% :
    (1) If the **studies,** he'll pass
    (2) If he **were** studious, he'd pass.
    (3) If he **had** studied, he would've passed.

Just what information does this questionnaire yield? There are many uses actually. For those entrusted with writing an ESL syllabus, there is some comfort in the fact that there is teacher agreement as to where structural items should be learned and that there is further agreement as to the sequence of related structures. But the chicken-or-the-egg syndrome is a nagging factor, and one can only wonder: did teachers assign certain structures to a learning level because they appraised the structures for intrinsic difficulties or is this the level which they are familiar with due to their experience with prevalent materials? To put it much more pointedly, are ESL teachers brain-washed by materials and experience to automatically treat structures in the same old ways? Obviously each teacher must strive for much more introspection and experiment with new sequences.

Dr. Marilyn Rosenthal of York College handled the part of the workshop that dealt with textbook evaluation. It is Dr. Rosenthal's contention that CUNY needs a central ESL data bank to which all CUNY campuses can contribute and from which they can retrieve information. During this workshop, she distributed a large number of ESL textbooks which participants evaluated on the spot using a check list that she had prepared. With this checklist she was able to extract valuable assessments from teachers who were familiar with various texts. Her plan is to make these evaluations available on request to any ESL teacher in CUNY, particularly those teachers engaged in setting up new ESL programs. Dr. Rosenthal is also chairing an all-CUNY Committee on ESL to plan subsequent meetings of ESL staff in CUNY with an eye toward exchanging ideas and materials.

READING INSTRUCTION IN ENGLISH AS A SECOND LANGUAGE COURSE

Of all the skills required for success in college, reading is one of the most important; teachers should therefore place a high priority on assisting their second language learners to become adept and proficient readers, as rapidly as possible. This was the view of the members of the panel, consisting of Gay Brooks and Linda Markstein, Manhattan Community College; Robert C. Lugton, Brooklyn College; Elaine Newman, Queens College; and Alice Osman, LaGuardia Community College.

The workshop limited its attention to a few topics that need exploration. One of the most troublesome of these is the English spelling system. The number of variant pronunciations for words that share a common spelling is a constant source of confusion **(though, through, enough, slough; laughter, daughter, slaughter).** Any technique that would help students translate the graphemic symbol into the correct phonemic sound would be a boon to the reading teacher. Two such systems were demonstrated by members of the panel.

The first was presented by Gay Brooks. It made use of wall-mounted charts on which the letters of the alphabet were printed in vivid colors. For instance, all the vowels in the following words would be in red: l**a**te, w**a**y, th**ey**, **ei**ght, str**ai**ght, v**ei**l, gr**ea**t, p**ai**l (same sound, same color). On the other hand, the vowel in the following words would be designated by different colors: p**a**t, w**a**s, v**i**llage, **a**ny, f**a**tal, sw**a**mp, **a**ll, **a**te, c**a**re (different sounds, different colors).

Use of the charts is easy. The teacher forms a word by quickly picking out letters on the chart with a pointer. The student, knowing the phonemic value of the letters from the cue provided by the color, has no difficulty in verbalizing the word. This system, devised by Caleb Gattegno, has been used with speakers of many languages. Apparatus are available through a local publisher.

A second alphabet, the Hoffmann OrthoepicAlphabet, was demonstrated by Elaine Newman. In this system, Roman letters are written in solid, hollow or dotted lines, depending on their phonemic value. For instance, once the student has learned to read NOT, he can immediately pronounce KNOT, the silent letter K being indicated by the way it is printed — in dotted letters. The student is eyecued to the pronunciation either by the type face or by other symbols such as dots. Because the Hoffmann system uses regular English spelling, transition from the special to the conventional print is usually rapid.

The panel next turned its attention to the student—who is far enough along to take regular courses in academic subjects while continuing to study English. In a demonstration designed to increase speed and improve retention, Linda Markstein took the audience through a selection from the **New York Times** on the plight of the American Indian.

The reader was first asked to note the time required to read the selection. Then he took a ten item, true or false test to determine how well he had retained certain facts from the passage. Next, he reread the article and repeated the test. Finally, the audience broke up into small discussion groups to compare their results.

Students were urged "to guess the probable meanings of unfamiliar words, since a knowledge of each and every word is impossible and unimportant. Focus must be shifted from an understanding of the individual word to an understanding of the content of the article, and this is achieved, in part, by the speed reading and comprehension exercises," Miss Markstein said.

A second approach, called "close reading," was presented by Professor Robert Lugton. In this approach emphasis is placed not only on reading comprehension but also on analytic techniques. Reading speed is not an objective in itself.

Two articles in the TESOL Quarterly, one by Eskey (December, 1970), the other by Pierce (September, 1973), state that second language learners experience maximum reading difficulty when they encounter certain types of complex sentences that are common in written English but rarely used in speech. Primary emphasis should be placed on sentence analysis, according to these writers. Professor Lugton felt that the concern for reading as a problem of sentence interpretation, although important, was too limited. He suggested a broader approach to reading.

In the cognitive technique the student is expected to penetrate beyond surface features into the texture and organization of the reading selection, and objective which is achieved in five steps: 1) vocabulary; 2) sentence structure; 3) sentence relations; 4) paragraph structure; 5) paragraph relations.

Occasionally, the student can correctly guess the meaning of a new word when it is supplied with a contextual clue; looking for contextual clues should be among the first points covered by the reading teacher. More often, however, unfamiliar vocabulary is not so clearly defined and calls for use of the dictionary.

If the dictionary is viewed merely as an inert collection of words, of verbal equivalencies that are dead and lifeless, this work can be stultifying; but if vocabulary study is thought of as an inquiry into the intellectual process by which man has imposed order on the chaos of his sense experience, then a new word becomes a tool by which order can be imposed by the student on **his** world.

It is only when we objectify our experience that it becomes malleable, that it can be sorted, indexed and catalogued. This becomes a point of interest in teaching second language learners because these categories are entirely manmade and may differ from one language to another.

In one experiment, students were shown a picture of an old man, his face seamed and drawn into a deep frown. When descriptive words for the face were solicited, the students offered "old," "tired," "worried," "angry." The teacher suggested "haggard," "unkempt," "leonine," all new vocabulary items to the class. After discovering that "haggard" meant "wasted and worn as from sleeplessness or grief," the students agreed that this word applied to the picture. It furnished an interpretive tool that deepened their perception and their understanding. They now saw the face in a different light than before. Words taught in this way are not seen as superfluous ornaments by students, but as an invaluable way to crystalize perceptions.

Sentence structure is an important factor in reading in-

struction and the articles by Eskey and Pierce in the **Quarterly** offer useful suggestions, but the teacher should not stop there. He should also go into the larger units of organization—the paragraph and the relations between paragraphs. There are a number of texts on the market which offer excellent practice in analytic reading. Some of these are:

Norman A. Brittin, **A Writing Apprenticeship**
J.C. Dent, **Thought in English Prose**
Robert B. Kaplan, **Reading and Rhetoric**
William D. Templeman, **Analysis of Prose**

To conclude the workshop, Professor Alice Osman discussed an individualized reading program she set up for adults at Regional Opportunity Center in Harlem. The purpose of this program was to give the participants a 6th grade reading level in English. The reading lab was coupled with speech and writing classes.

The program worked like this. CAT tests were administered to the students to determine present reading levels. Then each day the student would pick up a folder from the teacher before beginning the reading lab session. The folder contained a record of what had been read; it also contained a new assignment. Conferences with the student were frequent and a record was kept of these discussions. With each student working at his own pace and with interesting materials at the proper reading level, Miss Osman reported excellent progress.

(This reporter is grateful to Dr. Robert Lugton of Brooklyn College for allowing the paraphrase of his very complete report above.)

RECENT ESL RESEARCH

"Is Second Language Learning like First Language Learning?" was the title of a paper codelivered by Nathalie Bailey and Carolyn Madden of Queens College. In short, the researchers saw great similarity between first and second language acquisition for the following reasons:

1. The majority of second language learning errors are developmental (intrasystematic) rather than interferential (intersystematic), that is, similar mistakes are made by learners from all language backgrounds. No quarrel here from most teachers and linguists.
2. Initial learning differs from later learning in that language redundancies and extra-message information become more specific as learning progresses. For example, third person singular, simple present, the **-s** suffix is really redundant since "he," "she," or "it" also signal third person. The learner, since he already has one marker for third person, is apt to neglect appending the redundant **-s**. As his learning progresses, he learns to apply all rules, whether redundant or not.
3. The researchers assume that the longer the language entity, the more difficult it is for the learner. But to this writer this is unsustainable since there are obvious occasions where brevity is also difficulty, particularly in those cases where the brevity is a result of different imbeddings. In newspaper headlines, for example, brevity invites ambiguity (certainly a difficulty in processing) as in "Man Attacked at Night." Was he attacked or did he attack someone? Further, entities of the same length can show differences in difficulty of processing. Compare: "They fed him bread" and "He was fed bread." Both are four words long, but the latter example is syntactically more complex. That difficulty is a necessary concommitant of utterance length obviously needs more research.
4. Imitation occurs mainly where something is already understood and the students' stage of development can be tested by what they are unable to repeat. This point, too, needs further study; the pure audiolingual approach to teaching certainly demonstrated that parroting is a case where imitation did in fact take place when students did not always understand. Further, how can students' stage of development be tested by what they are unable to repeat? Language acquisition is cumulative, **ergo** positive, and must be tested by what appears as analyzable hard data. To do otherwise, invites mysticism. This point, although perhaps valid in the researchers' minds, is not all clear to the reader.
5. Closely paralleling point 2 is the fact that learner errors are made as students reject or confirm their own hypotheses about the language. Certainly current learning methodologies recognize the hypothesis formation is the most important learning strategy. The researchers, however, point out that "first language learners...reflect frequencies at first and later **generalize** rules..." (emphasis mine). The word generalize is merely half the story. There are various neural processes involved: generalization (for unmarked forms or those broad categories of "regular" entities) and specification (for marked or irregular items which form the exceptions to the "regular" categories). The researchers do state that students "have trouble with marked forms" and this is a learning strategy, too, since exceptions must be learned by specification.

Quite soundly, the researchers hesitate to characterize language development by any one process such as induction or deduction. Motivation (the desire to identify with another culture or required language instruction), the researchers conclude, accounts for much unsuccessful second language learning.

Dr. Stephen Krashen of Queens College presented the results of "Two Experiments in Adult Second Language Learning."

The first experiment dealt with whether or not language instruction is really necessary in view of the implications of a previous study (Upshur) which found that of two similar groups of foreign students, one group receiving no formal instruction performed as well as the group that received formal instruction. The inference is that a motivated student submerged in the language will "pick up" the language himself (Hill).

Krashen, in his first experiment, assumed that some kind of formal instruction is necessary since he found that for adults learning English in the United States, proficiency in the spoken language was significantly related to years of formal study and not to the amount that the language had been used by the learner.

It should be noted, however, that Krashen's study dealt only with proficiency in the **spoken** language. Chances are that if all language skills are measured for proficiency, greater support would be gathered for the necessity of formal instruction.

Having established the necessity for formal instruction, Krashen went on to examine the best method for instruction. In the past, no one has been able to establish "a clear-cut superiority" of one method, due to divergent needs of students, variables of motivation, age, sophistication. Krashen shows that another basic variable should perhaps be considered when a pedagogy is set: hemispheric dominance in the brain as reflected in eye movement. "The direction of eye movement in response to a question requiring thought is an indication of hemispheric dominance; right eye movement reflects left hemisphere thought (propositional, analytic, linear) and left eye movement reflects right hemisphere thought (analogical, inductive, synthetic)."

"The results of the eye movement study indicate that adults may use either deductive or inductive strategies in learning languages while the results of the first study show that they need formal language environments in addition to exposure to primary linguistic data. Children, however, are uniformly successful in informal environments using induction only."

Dr. Krashen rightly pointed out that there are some residual uncertainties: current testing procedures do not yield absolute results as to whether or not a student is left or right dominant; some students are in fact ambihemispheric. There are other uncertain areas to be examined like the student's ability to change or alter learning styles at different times. It is also possible that the major portion of the population is left brained if being right handed is an indication. (However, Dr. Krashen's research does not show a clear connection between handedness and which hemisphere of the brain dominates.) A Kantian pedagogy might emerge: the methodology that is good for most of the population is best. Furthermore, it just might be feasible that effective teaching includes utilizing known strategies as well as motivating new ones. These two experiments, then, support the conclusion that "both deductive and inductive strategies should be available in any given classroom."

The last half-hour of this workshop was devoted to a general meeting of ESL faculty in CUNY. The most pressing needs included a general list of ESL personnel and establishing avenues for cross-fertilization of CUNY programs such as the ESL Materials and Data Bank and a regular newsletter. Dr. Marilyn Rosenthal of York College volunteered to head a drive for subsequent meetings and to set up the ESL Materials Data Bank.

The following list includes the names of persons in charge of (or familiar with) ESL programs at the various CUNY campuses.

COLLEGE	PROGRAM AND NAME	TELEPHONE
1. Baruch College 17 Lexington Ave New York 10010	**Comp Ed** (Audrey Williams) **English** (Frank Scimone)	725-4430
2. Borough of Manhattan CC 134 West 51 St. New York 10020	**English** (Barbara Gonzales)	262-6663
3. Bronx CC 181 St. & University Ave Bronx, N.Y. 10468	**Spec Ed** (David Davidson, Irene Dutra)	367-7300 X338
4. Brooklyn College Bedford Ave & Ave H Brooklyn, N.Y. 11210	**English** (Robert Lugton) **Ed Services** (Lili Kapili)	780-5532 780-5202
5. City College of N.Y. 138 St. & Convent Ave New York 10031	**English** (Virginia Epperson, Nancy Lay)	621-2351
6. Hostos CC 475 Grand Concourse Bronx, N.Y. 10451	**English** (Diana Diaz) (Clara Velazquez)	993-8000 X319
7. Hunter College 695 Park Ave New York 10021	**Freshman & Dev'l English** (Jim Kohn, Ann Raines, Hortense Sarot)	624-7918 360-5670
8. John Jay College 445 West 59 St New York 10019	**English** (Bur Prit Sinah Bains)	489-5042
9. Kingsborough CC 2001 Oriental Blvd Brooklyn, N.Y. 11235	**English** (Robert Viscount, Howard Nimchinsky, Isador Apterbach)	769-9200 X429 X430
10. LaGuardia CC 31-10 Thomson Ave L.I.C., N.Y. 11101	**TELC*** (Donald R.H. Byrd, Alice Osman, Larry Anger)	937-9200 X302 X209
11. Lehman College Bedford Pk Blvd West Bronx, N.Y. 10468	**Academic Skills** (Thelma Borodkin)	960-8501
12. Medgar Evers College 317 Clermont Brooklyn, N.Y. 11205	**English** (Eleanor Frorup, Harriet Alonso)	783-7604
13. New York City CC 300 Jay St Brooklyn, N.Y. 11201	**Dev'l Skills** (Tom McBride) Elaine Newman, Rosario Gingras)	643-2960
14. Queens College 65-30 Kissena Blvd Flushing, N.Y. 11367	**ELI*** (Stephen Krashen)	520-7495 520-7074
15. Queensborough CC Springfield Ave & 56 Ave Bayside, N.Y. 11364	**English** (Roberta Weintraub) **Dev'l Skills** (Paul Panes)	631-6303
16. Staten Island CC 715 Ocean Terrace Staten Island, N.Y. 10301	**English** (Sita Kapadia)	390-7779
17. Voorhees Campus of New York City CC 450 West 41 St New York 10036	**CAS Dept** (Sarin Cohen)	

18. York College
150-14 Jamaica Ave
Jamaica, N.Y. 11432

English (Marilyn Rosenthal) 969-4067

*Indicates a full-time intensive precollege program in addition to part-time credit and noncredit programs.

Preparation of the Open Admissions Teacher

ALAN COOPER
Department of English
York College

At the outset I am going to assume that this entire discussion concerns higher education rather than continuing education; that higher education leads to the baccalaureate degree;and that by "Open Admissions Teacher" we mean someone working in higher education who, unlike his colleague in continuing education, is obliged not merely to help a student learn as much as he can absorb, but to bring the student to some fixed point in a curriculum. Moreover, I am going to assume that our purpose in admitting traditionally unprepared students is not to weaken higher education or to redefine it as whatever can be learned by a post-adolescent. Rather our purpose is to provide a way for the late-blossoming mind or the previously blocked or malfunctioning intellect to overcome dysfunction and engage in baccalaureate education.

These assumptions do not make us Pollyannas. We know that many students will not complete a legitimate baccalaureate program; that shifting population and inner-city turmoil present major changes in our student bodies. We know that these students have been low achievers, that their intellectual circuits have been broken by social, physical, nutritional, familial, and even institutional impeders. Certainly, we know that if they are ever to attain intellectual strength and academic success, they will require extreme patience, warmth, dignity, and conscious motivational support. It is important that we bear in mind the effects of our judgment of them. Their success or failure will inspire or discourage others, and some of those whom we declare successful will be licensed to teach—to nurture or stunt the intellectual and social growth of the next generations.

In a city-wide system of education beginning with nursery or day-care schooling, the City University represents a final achievement; consequently, our every move, whether in curriculum development or the enforcement of standards, signals responses and changes of practice right down the line. Traditionally the City University has stood for excellence. It would be a grim joke on long-betrayed social groups if their new upward mobility coincided with a reduction of educational possibilities; or if the level of intellectual development afforded their predecessors were. . in the name of some vague but shortsighted guilt. . denied to them.

The most important requirement of a teacher for the open enrollment program, then, is not that he resemble the students he must teach, nor that he have a "special" sympathy for them, nor that he have prior experience of them, nor even that he be wise enough to expect rather little of them at the outset of their college careers—though some or all of these attributes are useful—but the most important requirement, to me, is that he know the ultimate level of performance expected of his students and that he be committed to that level as higher education. Such a commitment will exist and endure only if he himself is working with intellectually challenging ideas. He can watch his students grope in the cellar of his subject and admire them for groping; but he must counter-balance his daily exposure to illogic and misinformation by scholarship lest he unwittingly begin to acquiesce in a lower standard. In short, the teacher must not ever come to believe that most of his students—malfunctioning as they may be when they are admitted to college—cannot overcome their dysfunction and perform as well as *he* was expected to perform. Nor must he perpetuate, in the name of liberalism, what his gradeschool predecessors practiced in the name of despair, that most base form of patronizing—the inflated grade.

How do we apply this sense of over-all purpose to the question at hand? What is proper "Preparation of the Open Admissions Teacher?" Much depends on the discipline. My discipline is English and my open-enrollment mission is literacy. Now literacy has no absolute analogue in mathematics. I assume that there are math teachers capable of teaching algebra or trigonometry who will never master higher calculus or abstract theoretical math. But I can't assume that there are composition teachers who can master and teach sentence structure or paragraph development without ever knowing tone and usage and nuances of style, the whole sense of the discourse. And that sense comes from repeatedly having something worthwhile to say and being forced to work out the best way of saying it. It also comes from reading "the best that has been thought and said."

I have some fears about Open Amissions, but they are not fears about students. I fear the use of Open Admissions as a rationale for those who wish to escape from unpleasant teaching situations into what they believe will be pleasant teaching situations. I suspect the new emphasis on missionary dedication among most of its ardent asserters. People who tell me that they would willingly work forever in the vineyards of parallelism, be the drawers of punctuation, and the hewers of run on sentences arouse my deepest skepticism. On the other hand, when someone hired to teach compensatory courses comes round after a couple of semesters asks for an elective or at least a survey course, I am relieved and eager to find him one. What I fear most is Open Admissions becoming an excuse for the creation of petty industries, or jurisdictions and power bases— of the churning out of supposed scholarship that is no more than the sharing of anecdotes. I fear that more and more energy will be given to shows of concern and less and less to what is most transferable to students, working through worthy ideas in good prose for a demanding readership. Yes, methodology should be shared, but I fear the creation of an establishment to share it, especially as course offerings in the pedagogy of college English teaching

The best preparation for Open Admissions teaching, aside from a firm sense of what higher education is, lies in personality qualities that cannot be developed in graduate programs. No credentials formally conferred guarantee warmth, patience, humility, tough-mindedness. From the standpoint of the colleges, then, the best preparation is a kind of natural selection. Once Open Admissions is widely accepted as a fact of collegiate endeavor, those who cannot relate to such students will more and more seek employment elsewhere; but the pool

of talent from which the right personalities may be drawn should continue to be maintained by high-level graduate programs. Internships, tutoring, all kinds of early exposure to the Open Admissions student are important factors that should aid the process of selection. But most of the special training that will distingusih a successful Open Admissions teacher from a failure must come, as in almost every other profession, on the job.

Launching a Remedial Reading, Writing, Speech Program: Titanic or Good Ship Lollypop?

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Any discussion of a new course or program should include four aspects: its theory or reason for existence, reality as it evolves, an indication of its methodology and, of course, evaluation of its worth. I'm going to begin my discussion of our new program, Communication Skills, with our reasons for adopting it.

The traditional college departmental structure which relegated writing to the English Department and relegated speech to the Speech Department worked well enough for traditional students, even though it separated two related skills. With the entrance of nontraditional students in the City University, SEEK students in 1965 and Open Admissions students in 1970, there was a need to introduce reading, another related discipline, into the curriculum. This related skill was assigned to one of several departments throughout the units of CUNY; at Baruch College it was and is taught in the Compensatory Programs Department.

So we had the peculiar situation of three communication skills divided among three separate academic departments. Again, this worked no hardship on the traditional student, already trained and capable of working well in the often topsy-turvy world of New York City school structures. It worked a special hardship, however, on the remedial students who might be taking still another remedial course, math, in a fourth department. Remediation approaches varied widely from department to department; the student was caught between often sharply conflicting ideologies. For example, at Baruch students worked on computers (CAI) to learn grammar in the English Department. Simultaneously, their reading courses had a very different approach in the Compensatory Programs Department. In speech, students were put in regular classes of 20-25 students; the teacher was expected to deal, in a large-class situation, with problems of English as a Second Language, Black English, and with many levels of spoken English. In addition, students were assigned to counselors who in general had little contact with the teachers in any of the several academic departments; communication among those who were guiding remedial students was poor—too often nonexistent.

Our need, to restructure the experience of our non-traditional remedial student, resulted in Communication Skills, a new course. Students whose test results were lowest in the written English placement exam (approximately two or three hundred students out of sixteen hundred tested) were placed in this course. In theory, this restructuring made sense. Communication Skills was intended as a program to coordinate the language skills of reading, writing and speaking by breaking down arbitrary separation of those skills and to present to our students a coordinated approach to the skills of the English language. Class size was limited to a maximum of 15. Incorporated into the program was an attempt to vary methods of instruction through the use of non-print materials such as videotape and films.

We set up teams of teachers from each department, Speech, English and Compensatory Programs. Each team of three teachers conducts three classes; the three teachers jointly plan the term's work and jointly evaluate the students' progress. The team works closely with the counseling staff. In fact, the counselors often become an informal part of the "team." The student spends 9 hours a week in Communication Skills classes with 3 hours devoted to each of the 3 components and with additional mandatory conference hours. Generally, each teacher meets with his individual class. This procedure does vary, however, especially when films or videotapes are being utilized. This semester we have succeeded in forming a group of dedicated, creative teachers who meet to resolve the problems we all share by developing new materials and new approaches to teaching and to establish valid methods of evaluation.

Reality, of course, always differs from the dream. The reality of the team-teaching situation, as those of you who have worked in this structure know, is sometimes difficult. Training, experience and methodologies differ, but the one thing we have in common is that each of us is accustomed to being omnipotent in the classroom, and, in itself, this fact can present problems. The largest factor which offsets them is that the team-teaching situation provides a supportive atmosphere in which the single teacher no longer faces difficulties he has not been trained to face. Team teaching minimizes the incidence of our problems, objective and subjective.

At Baruch, after two terms a new program must receive faculty approval or be dropped. Therefore, much of our effort has been directed to various political activities unrelated to our teaching situation.

A third problem is staffing an interdepartmental program. Who makes decisions? Three chairpersons must correlate their activities. Each department represents a small fiefdom; who should be hired or assigned to the program? Who controls the lines? These are real problems for the teaching staff. How much prestige is there in working in such a program? While working on Communication Skills, a time-consuming occupation, the teaching staff member is expected to attend regular departmental meetings as well, to accomplish relevant committee work. Failure to do all this may put him in danger of losing his position.

The overwhelming problem which we have had to face with the faculty has been that of credits. Since procedure for granting credits varies from one unit of CUNY to another, our problems in one may not be similar to those of other units. Current policies of granting credits for courses with remedial components differ widely.

The title of my presentation: "Launching a Reading, Writing, Speech Program: Titanic or Good Ship Lollypop?" resulted directly from this. One of my colleagues reacted to the title by saying, "But they're both disasters!" Obviously the **Titanic** evokes an image of disaster. But the **Good Ship Lollypop?** If you're old enough to remember Shirley Temple as a child star, you'll remember that the song itself doesn't suggest disaster—it suggests merely an uncomplicated never-never land where all wishes can be gratified immediately. It's not very different from the Beatles' song, written long afterwards, "Lucy in the Sky with Diamonds":

Picture yourself in a boat on a river
With tangerine trees and marmalade skies
Somebody calls you, you answer quite slowly,
The girl with kaleidoscope eyes.

This is still the escapist dream, albeit inflated by drugs, since "Lucy in the Sky with Diamonds" is an acrostic for LSD. If, however, we say that all dreams of escape, of perfection, of a search for final and absolute answers are doomed ultimately to clash with reality, then the Good Ship Lollypop can sail only to disaster. This is precisely where we are now in our program: the juncture of the dream and reality with disaster a reasonable contingency for the future.

In reality we shall not find a magic solution that will turn all those who come to us with severe remedial problems, especially in the language skills, into successful college students. Dreams, wishes, great ideas, love are not enough. We need to have realistic goals and attempt to implement them. In our present academic structure implementation is hard, and sometimes seems almost impossible. What we can attempt to do is to change the structure so that students who come to us with the greatest likelihood of failing in college can get their most exciting, most demanding, best staffed and most supportive academic experience.

We must agree to finance this approach adequately if we are serious about the goals of Open Admissions. In addition, and perhaps most important of all, these programs cannot serve as an official guillotine for students whom the college wishes to drop as soon as it can do so decently. It is a travesty to accept students, whatever the level of their skills when they enter college, and insist they make up these deficiencies in a maximum of two semesters or be debarred from college. Any remedial structure must be flexible enough to make provision to counsel those students to withdraw who do not do enough work or who don't attend classes and, therefore, make little or no progress. At the same time, it should be flexible enough to allow—to encourage—students who attend classes regularly, who consistently work hard and who show progress in their work to remain for as long as it takes them to "catch up to the level of the traditional college student." In our team situation three teachers work regularly with each student and with his counselor each semester. Intelligent decisions concerning each student must be made, for the most part, at this level. No teacher with any integrity is going to don the hangman's black hood and act that part for the college in order to get rid of that enemy of the institution— the non-traditional remedial student.

If we can avoid these pitfalls, I believe that the Communications Skills Program is sound and has the potential to develop some of the answers we so desperately seek.

This brings me to the one area over which we do have control—materials and methodology. I strongly advocate the use of new materials to encourage and improve the writing of the non-traditional student. We have long accepted the use of the "model essay" for demonstrating good writing to our students. Films can be used similarly, and they have several inherent advantages.

A film has much in common with the kinds of writing we ask our students to do. First, the aim of the film is to communicate an idea or an emotion. Second, each art form, and this includes the film, must maintain a point of view toward its material. Third, the method of presentation necessarily involves a process of selection and use of specific details. Decisions must be made about what to omit, what to edit. Fourth, any art form has an organizational pattern for achievement of desired results.

There are special reasons for utilizing media such as films, television, videotape, records and tapes. K. Patricia Cross, in **Beyond the Open Door,** says that because these learning tools are unlike the printed page and relatively new to the classroom many of our remedial students do not associate them with previous failure. I do not mean to suggest that we can ignore the printed page. If our goal is to help students to survive in college, necessarily we must deal with it. It is, after all, the medium of learning in practically every class they will take. Since they will be utilizing books for the rest of their lives, obviously they must have experience with the printed page.

Beyond the classroom, in the "real" world, much of our information does not come from the printed page but from visual images—television, advertisements, movies. David Sohn writes "we cannot escape the language of images or the need to understand and to come to terms with that language." Visual images, however, are the one aspect of language rather consistently ignored by college teachers.

Not all teachers are comfortable in experimenting with new materials, and no program can insist teachers work with materials that make them uncomfortable. Therefore, to motivate experimentation, some of our efforts have been devoted to workshop demonstrations for our staff, in the hope that the resultant dialogue will make better teachers of us all. Again, one function that any program such as ours performs is the encouragement of on-the-job training for teaching staff—a new idea to college teachers at CUNY and elsewhere.

Open Admission confronts us with a problem extending beyond specific needs of remedial students. We need to develop methods and materials appropriate for students who have found school a bore and who haven't experienced academic success. We need to learn better ways to free our students from classroom passivity, to motivate them to think, question and communicate. For success, our structures as well as our methods and materials may have to bend a bit, as may our criteria for hiring and reappointing. To mix an already somewhat confused metaphor, we are all sailing together on that river lined with tangerine trees, and it may require all our best strategies not to sink with the Titanic or the Good Ship Lollypop. Our continuing job is to stay afloat until we can reach the harbor of our ultimate destination.

Syllabus for English 1
The Classroom Committee Approach

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Because it is important that English 1 students learn the grammar they don't know, grammar is emphasized in this course, but because teachers have tried and failed for many years to teach grammar to these students, the problem of teaching is handed to the students themselves. They assign themselves to one of these groups—Sentence Structure, Verb, or Word (spelling and parts of speech)—and although they are prepared to teach by the instructor, and are given adequate materials, they do the teaching and often devise their own methods and materials. When they do this, they reflect an understanding of the problems their peers have that is often more profound than the instructor's. Usually the instructor decides lesson order; sometimes, however, the students ask for a particular lesson, or even decide to teach one.

It is important that the students write and proofread a great deal during this grammar study period in order to transfer what they are learning into their writing. Therefore, there are 2 in-class writing assignments a week, and the student must also hand in a 3 page journal weekly. All writing assignments must be completed before the student passes the course, and falling behind in the writing assignments is considered serious by the instructor. The student is required to attend frequent conferences during which instructor and student go over each paper together. One hour a week is devoted to proofreading a student paper. Students analyze the sentences of the paper in turn. All class members act as consultants, and the instructor presides.

The week is fairly definitely structured. In the 2 hour lesson on Monday, 1 hour is devoted to a grammar lesson, taught by a student, and 1 hour is devoted to in-class writing. On Wednesday, the entire class proofreads one of the Monday essays, which has been duplicated by the instructor. On Friday, the class writes again, either rewriting the Monday essay, or writing a new assignment. During this hour, the instructor visits at least 1 group and prepares it to teach a lesson for the following Monday. The group then decides how and by whom the lesson will be taught.

Because all the groups work simultaneously, grammar is attacked from all sides at once. At any time a student may request a lesson on any problem. Nevertheless, the emphasis in the beginning is on sentence structure, proper sentence punctuation, and the elimination of fragments and comma splices. At this time the Verb group attacks the less vexing problems of tense consistency, and the Wordgroup drills on spelling or provides background lessons in parts of speech. Once the problems of sentence structure have been thoroughly explored, the Sentence Structure group will continue to provide reenforcement and exercises, while the Verb group moves into the major problems of subject-verb agreement and irregular verbs.

A typical semester's syllabus might read like this: Week 1. Hour 1: Explanation of course objectives and requirements. Students sign up for committees. Hour 2: Students write an essay, "The Last Job I Had and What I Thought of It." A simple grammar sheet, explaining how to identify a sentence's subject and verb, is distributed as homework. Hour 3: An essay written Monday is dittoed and distributed for proofreading exercise, with emphasis on subject and verb identification. Hour 4: Students sit in committees and rewrite Monday's essays according to corrections made by instructor. Instructor provides Sentence Structure committee with grammar sheets, explaining dependent and independent clauses, and goes over the material with them.

Week 2. Hour 1: Student from Sentence Structure group provides class with materials and goes over clause lesson. Hour 2: In-class writing assignment, "A Dream I Had, and What It Meant to Me." Hour 3: Proofreading one paper. Hour 4: Rewriting of papers; instructor provides Verb group with sheet on present tense and Spelling group with list of difficult spelling words.

Week 3. Hour 1: Member of Verb group explains present tense. There is time for Word group to hold a fifteen minute spelling bee. Hour 2: Present tense writing assignment: "How I Am Different From My Friend." Hour 3: Proofreading. By this time all grammatical errors are being considered, but special attention is given today to tense consistency. Hour 4: Rewriting of present tense paper. Instructor visits Word group and gives members elementary instruction in paragraph structure, and sheets with 7 different sample paragraphs, which are reviewed for consistency, appropriateness of topic sentences, proportion, use of transitional phrases, etc.

Week 4. Hour 1: The paragraph is taught by a member of the Word group. Short spelling bee. Hour 2: 4 paragraphs, imitations of 4 of the 7 paragraphs provided, are written by class. Hour 3: Proofreading, with special attention to paragraph structure. Hour 4: Rewriting of paragraphs. Verb group given material on past tense. Week 5. Hour 1: Past tense instruction and spelling drill. Hour 2: In-class writing assignment using past tense: "What I Did Last Weekend." Hour 3: Proofreading. Special attention to tense consistency but sentence structure always discussed. Hour 4: Rewriting of past tense paper. Word group given short page on identification of prepositions and prepositional phrases. Sentence Structure group given short half-page story totally mispunctuated for correction.

Week 6. Hour 1: Lessons in prepositional phrases and punctuation of sentences given. Hour 2: In-class assignment: Write two good paragraphs on a place or person, the first paragraph describing your first impression, the second your later, considered opinion. Hour 3: Proofreading. Hour 4: Correction of two paragraphs, particularly from point of view of paragraph structure and topic sentence. Word group given spelling rules, Verb group given future tense materials.

Week 7. Hour 1: Spelling rules and future tense taught. Hour 2: Writing assignment in future tense: "What I Will Be Doing Five Years From Now." Hour 3: Proofreading. Hour 4: Rewriting of essay. Word group given lesson on how to quote dialogue.

Week 8. Hour 1: Lesson taught on quotation. Hour 2: Writing Assignment, "A Conversation." Hour 3: Proofreading. Hour 4: Rewriting of conversation. Verb group goes over subject-verb agreement material,

and is given copies of old departmental tests on subject-verb agreement.

Week 9. Hour 1: Subject-verb agreement test reviewed. Teacher briefly explains how to structure a simple thesis essay, one paragraph with thesis, two or three giving a reason each to support thesis, one paragraph of summary. Hour 2: Thesis essay attempted: "What One Thing Would You Most Like to Change at This College?" Hour 3: Proofreading, special attention to essay form. Hour 4: Rewriting of essay. Word group given apostrophe lesson.

Week 10. Hour 1: Apostrophe lesson given, and spelling drill. Hour 2: Thesis essay: "What is Wrong With My Neighborhood?" Hour 3: Proofreading. Hour 4: Verb group given information and list of irregular verb forms.

Week 11. Hour 1: Irregular verb form instruction. Drill on verbs in list which is distributed. Hour 2: Thesis essay: "Can a Man and a Woman Be Just Friends?" Hour 3: Proofreading. Hour 4: Rewriting of essay. Grammar lessons studies are now adapted to class's weakest points, sentence punctuation review, subject-verb agreement, spelling.

Week 12. Hour 1: Grammar lesson taught. Hour 2: Thesis essay: "Should Parents Who are Unhappy Together Divorce?" Hour 3: Proofreading. Hour 4: Rewriting of thesis essay, or writing of new one. Old departmental irregular verb forms test gone over with Verb group.

Week 13. Hour 1: Verb group student goes over old departmental irregular verb forms test. Hour 2: Writing of a thesis essay. Hour 3: Proofreading. Hour 4: Rewriting of essay or writing of new essay. Problem areas in grammar review with appropriate group.

Week 14. Hour 1: Grammar lesson. Hour 2: Thesis essay. Hour 3: Proofreading. Hour 4: Thesis essay. Sentence group given really difficult complex sentences for analysis and punctuation.

Week 15. Hour 1: Sentence group goes over lesson with class. Hour 2: Thesis essay. Hour 3: Proofreading. Hour 4: Final essay written.

Tandem Learning

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Tandem Learning puts into practice two basic premises for education of Open Admissions students:

(1) reading interpretively and writing interpretively are two separate but co-requisite skills, the basis of all other learning processes; and

(2) an efficient and invigorating way for the student to acquire these abilities is in two separate courses with two different teachers but with the same students and with two distinct programs of study. Both revolve around a single topic.

The topic in Humanities 4 this semester is "The Literature of Laughter" which I am teaching in coordination with a section of Basic Writing 2 taught by Professor Gerald Kauvar. Humanities 4, funded by the National Endowment for the Humanities, is designed to introduce students to the techniques and vocabulary of literary criticism. A course offering basic readings in biology, sociology or engineering would serve the same purpose for those disciplines. Teach the student how to analyze what and how he reads and how to transform analysis into a clear and coherent essay, and the student will discover, by practically independent efforts, the ease of application of these procedures to any subject.

A replay of the first week's assignments in this semester's coordination illustrates that the learning process in both areas (reading and writing) accelerates because assignments in each course supplement and reinforce the other.

On Monday, Prof. Kauvar asks the students to write an essay in class, either to define laughter or to describe a humorous incident. On Tuesday, Dr. Samuels meets with the same students and distributes a selection of short literary pieces. In their first attempt as literary critics the class analyzes the pieces, both to determine the writers' literary techniques (how) and to speculate on reader reactions (why). On Wednesday, Prof. Kauvar reads over the students' first in-class essays with them, and, in addition to dealing with grammatical and structural problems, they discuss the relationship between what they wrote about laughter based on personal experience on Monday, and their discussion on Tuesday, about laughter as evoked by literature. On Thursday, Dr. Samuels presents Thurber's "The Night the Bed Fell." Already, the class approaches the selection with some clearly articulated ideas of humor and a simple and accurate critical vocabulary. In the course of the discussion terms like "ridicule" and absurdity" come up, and on Friday, Prof. Kauvar makes this new critical vocabulary the basis for a session to define and use words. This session is the prelude to their second writing assignment and a preparation for Dr. Samuels' ongoing treatment of the comic techniques of Chaucer and Aristophanes.

In one week the students have developed a degree of sophistication and skill that, for the best basic writing instructors, would take considerably longer to develop. Again, because the students see one another five days a week, they quickly become friends, and by the third week are working together as an organized team.

Recent interviews with participating students, who had no previous knowledge that they were part of an experimental program, further confirm the positive results of tandem learning. The students indicated they enjoyed being able to deal with such a problem as the difference between tragedy and comedy from alternate points of view on alternate days. They saw a distinct difference between oral discussion of critical problems and having to commit their opinions to paper: they recognized, in other words, that there were two separate skills involved; and that, mastered independently, these two skills functioned together to help them understand other people and help make themselves understood.

They expressed healthy concern as to whether the methods they were learning as literary critics could be employed in other subject areas, and suggested to their instructors their readiness to apply their newly-developed expertise in more expanded subject areas.

It appears after the observations of instructors and students that the relationship between "reading" and "writing" on the college level in particular has not been so obvious as educators assume. Tandem learning assumes the two disciplines are like two riders on a double bicycle, each with separate activities and controls but each dependent on the other for proper balance and coordination. Together they cooperate in quick and effective advance to knowledge.

The Graduate Literature Degree vs The Needs of Open Admissions Teachers

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I assume that the directors of this conference call this meeting a "workshop" because they hope for an open exchange of views and for active participation by anyone interested. I have not assembled, therefore, a panel of speakers. Instead, I shall begin discussion with a formal presentation. First, I shall attempt to set our situation at CUNY into the broad perspective of the national situation in higher education. Then I shall offer an analysis of the causes for the widening gap between the graduate schools and our changing undergraduate colleges, as that gap is made manifest within CUNY; and finally, I shall present my ideas for a long range solution as contained in a specific plan applicable to the current situation.

I must say I am very pleased that this workshop is taking place. It is, insofar as I know, the first acknowledgment by the City University that there may be some relationship between the preparation of college teachers at the Graduate Center and what is taking place in our nineteen undergraduate junior and senior colleges. At the undergraduate level, CUNY is paving the road to the future of higher education. At the graduate level it is filling pot holes on a well-travelled street.

When I first realized that our graduate programs in English needed to be brought into line with the realities of the undergraduate classroom and began advocating that our graduate schools reassess their responsibilities and goals, I had no gray in my beard; in fact, I had no beard. That was a decade ago; it was in the pre-hirsute era.

Before considering the specific problems of the Open Admissions teacher of English at CUNY, I'd like to set them into the perspective of the national situation. I was chairman of the English Department at City College from 1964 to 1970. During that period I served for three years on the National Executive Committee of the Association of Departments of English. I attended many national and regional conferences concerning problems of English Departments, and conducted a number of workshops for chairpeople in various areas of the country. Visiting campuses and talking with other chairpeople from junior and senior colleges, large and small, were enlightening experiences. At City, at this time, I was facing all the problems that descended upon the entire University in 1970 with Open Admissions. The SEEK program was introduced at City in 1965, and in each succeeding semester, as the program grew, I devoted more and more time and thought to it. Travelling around the country I discovered that, before SEEK and Open Admissions, we at City were very privileged. Our students were very well prepared academically before they came to us, and we therefore knew very little about the situation in most of the colleges throughout the country. When I spoke about the new problems SEEK was presenting to our writing teachers, not many chairpeople were impressed. David Stewart, then chairman at Idaho State, said, "That's child's play. You should try teaching writing to Indian students." On the west coast, English teachers had been struggling for years to teach Asian students to write English compositions. In the Southwest, Spanish-speaking students present similar problems. At the many Black colleges throughout the South, our problems were also well known. I visited a small college in Maine where entering students with high school averages of 70 or so were not unusual. The English teachers there worried about teaching the French-Canadian students.

There are some 1,250 senior colleges in this country. Only a small percentage of that number—the name colleges and universities—teach students with the kind of high school averages we used to require at CUNY colleges. Most of the other thousand or so of these colleges have been dealing for years with what we now call Open Admissions students. The big difference is this: the students who attend those colleges have to pay and those colleges need their money to exist. Over the past fifteen years or so approximately a thousand new junior colleges have been established. More come into being every day. The students attending these junior colleges are not the students with high school averages in the 80's.

At the national and regional conferences I attended, the English Department chairpeople hoped to discover some new formula that would solve the problem of teaching writing. What they discovered was that their problems were not unique. Everyone was floundering and doing as best he could. A large number of these senior and junior colleges had been founded or had been expanded as a result of the unprecedented growth in the college student population from 3,000,000 in 1950 to some 7,000,000 by the end of the 60's. In a short period, colleges had opened their doors to minority groups with new language problems and to massive numbers of students who were coming from public high schools rather than from preparatory schools. Recent estimates indicate the escalation has reached its peak, and that the college student population will now level off. I seriously question that prediction. Colleges are now opening their doors to an entirely new group of students—adults who want to continue their education. This movement, I am sure, will spread. And I do not believe for one moment that Open Admissions will stop at the borders of New York City. Some amount of free higher education is as inevitable in our future as free high school education in our past.

Over the past two decades, therefore, undergraduate education has been undergoing all kinds of unforeseen changes. What exists at the present moment in higher education is a fluid undergraduate structure, attempting to cope with altering social conditions in the nation, alongside a monolithic, static, archaic graduate structure.

That would cause no trouble, if the undergraduate structure were not so dependent upon the graduate schools. They are linked together because our graduate schools enjoy the power and the privileges of a giant monopoly. One of the privileges of a monopoly is freedom from the demands of the marketplace, and that privilege our graduate departments have enjoyed, at least until now. 95 percent of the teachers in the approximately 2,500 junior and senior colleges in the nation are supplied by our graduate departments. These departments are eager to place their graduates, particularly their Ph.D.'s in teaching positions. They work hard at it. None of these

departments would admit for a moment that they were in the business of training college teachers. The very idea is anathema. Training teachers is done by teacher's colleges, not by graduate departments. And that is why no graduate English Department, for example, would bother to find out if the products it is turning out are what the market needs. Why should it? It not only has a monopoly, but it so skillfully indoctrinates its products that they blindly support that monopoly.

You've all undergone this indoctrination. The process starts long before the student enters the graduate department. His college professors are already druids and their greatest sense of achievement comes when they create mirror images of themselves. When a student enters a graduate program in English, it is not to engage in a program of literary study alone. He recognizes he is dedicated to literary scholarship and to the glory of the scholar. The mission of the Graduate English Department is to train literary scholars. Nothing must taint that noble mission. Purity of though is essential. Any talk to education *per se* is taboo. It is tantamount to encouraging sex in a seminary. This process of indoctrination is so intense and so effective that almost no one emerges from our graduate departments without a sense of superiority because of a pure devotion to the study of literature. And though he knows he will be a teacher, that he wants to be a teacher, he takes pride that he has remained uncontaminated by any brush with pedagogy. Even those who remain in the seminary for only a short time come out with this deeply rooted prejudice and with a beatific vision of the sacred academic hierarchy. The high priest, respected and envied because he teaches nothing but his specialty and can devote himself to scholarship, is the graduate school professor. Below him are the priests, the senior college professors who teach literature electives. Below them are the newly ordained who aspire to those electives. At the very bottom of the hierarchy are those who teach writing, a lowly chore reserved, if at all possible, for acolytes.

Because the English teachers in all those junior colleges and small senior colleges have been so indoctrinated with this image of professional status and because the teaching of writing is considered a temporary chore above which one will eventually be able to rise, the shameful status quo is being perpetuated. We don't know how to teach writing to rural Blacks in the South, Asians in the far West, Indians in the West, Canadians in New England, Blacks from the ghettoes. Most of them have had inferior academic opportunities in our public schools. We have not been willing to admit this fact because that would not only acknowledge incompetence but involve us in pedagogy. And why, after all, should we spend time and effort worrying about teaching grammar and writing, when our real interest is in moving up in the hierarchy so we can teach literature and achieve professional status?

The time for accountability is rapidly approaching. The signs are there for anyone to see. CUNY has pledged that it will not tolerate a revolving door as an Open Admissions policy and will learn how to deal with the problems of poorly prepared students. Junior colleges, more and more, are rejecting English Ph.D.'s and turning to doctorates in education. These junior colleges and the undergraduate colleges of CUNY are facing the realities of the new responsibilities of higher education. We know we are not prepared for the challenge because our own training is inadequate. What are needed in our classrooms are competent teachers, professionals. Because their exclusive goal is the preparation of professional scholars, our graduate programs make no attempt whatsoever to provide any kind of training for classroom teaching. Their idea of the proper preparation for a future Ph.D. is to send him to a local college to get his experience. And they don't care at all that he probably does not know enough formal grammar to teach it or that he hasn't the slightest notion of how to teach. And because those in charge at the colleges are so caught up in the graduate school syndrome themselves, they are not interested in what happens in classrooms. The colleges get cheap labor; the acolytes get experience. Everyone gains, except the students. They need teachers; we give them untutored, unprepared trainees.

That may have worked in the days when the students had already reached a fairly high level of competence and the composition teacher could occupy himself with eliminating trite expressions and encouraging liveliness of thought and expression—but not today, and certainly not in our CUNY classrooms. Our students want to learn. They do not stand in awe, as we do, of the preiesthood. If they can't write a sentence, they want to be taught, and they are going to catch on very soon that we don't know how to teach them.

Graduate English programs must be indicted, I believe, on at least four counts (to use the terminology appropriate for this time in history).

1. They are guilty of unconscionable snobbery in refusing to acknowledge that they are in the business, vulgar though it may be, of training college teachers. As a result, to quote a conclusion of a conference dating as far back as 1949, the college professor is "the only high level professional man on the American scene who enters upon a career with neither the pre-requisite trial of competence nor experience in the use of the tools of his profession."

2. They are guilty of irresponsibility in refusing to acknowledge, in any way, that their graduates will be called upon to teach courses other than literature. There is no acknowledgement, in our graduate programs, that the teaching of writing is a major task of 98% of the English departments in this country and that much of that teaching is actually remedial level teaching. As a result, the products of our graduate English departments, whether M.A.'s or ABD's or Ph.D.'s, don't know enough grammar to teach grade school.

3. They are guilty of a fanatical disdain for the profession they practice. College professors pay much lip service to teaching, and they take much pride in thinking of themselves as great teachers; but they know little about teaching and they know almost nothing about education. Subject-matter snobbery is so deeply ingrained that our graduate departments are convinced merely one year of literary study is sufficient to qualify someone to enter a college classroom and teach. As a result, with our our high-minded insistence upon the importance of a Ph.D., we have been perfectly content to relegate about 60% of college teaching to those who have not completed the Ph.D. Here at CUNY, more than 50% of the teaching staff does not hold a doctorate. It's hard to imagine such a

situation occurring in any other profession. Who would tolerate it?

When the college students were already well trained, placing them in the hands of the semi-qualified did not matter too much. But at CUNY, with the advent of Open Admissions, our traditional disdain for teaching has caught up with us. With the sudden massive increase of students in need of remedial English work, the professors were delighted that we needed a whole crop of new teachers who would take over the task of basic English. A few of the many M.A.'s and ABD's who joined the staff had some classroom experience. Most did not. Very, very few, if any, had any special skill or background or training for the massive responsibility with which they were faced. Where could they have received such training? At teacher's colleges, perhaps, but if they held degrees from a teacher's college, the chances were that we did not want them.

Traditionally, the college teacher has depended upon the primary and secondary school teacher to teach grammar and writing. He has not spent much time worrying about how to teach writing. If a student didn't put an "ed" on verbs to form the past tense, the professor simply told him: "The past tense is formed by adding 'ed.' You really should know that by this time." The next time the student failed to use the "ed," the professor judged him incapable of college-level work and flunked him. It was easy. We did not have to teach; we functioned as judges, arbiters of standards. The M.A.'s and ABD's who were appointed here at CUNY to do what experienced professors of English did not feel competent to do, did not even have experience in their favor. Their one asset was a strong sense of social and educational commitment.

If we are going to be honest, that commitment is just about all we have been building upon these past few years. But commitment is not enough. We have been floundering. We are still floundering. I know. I teach composition. I see the results of the tremendous dedication of other teachers, and they are truly dedicated. It is not enough. As this conference testifies, there is a good deal of thinking and a good deal of important experimentation going on at CUNY. But the insights into the teaching of Freshman writing we are slowly gaining must be transmitted to those now in graduate school. That is not being done in this University.

4. The final charge against the graduate English Departments is their refusal to acknowledge the changing responsibilities of the college English teacher, particularly at freshman and sophomore levels. At these levels, English teachers frequently don't come close to teaching literature; and those who insist upon teaching literature are probably failing to meet the needs of their students. The English teacher at these levels cuts across disciplines. He has to make students aware of ideas, all kinds of ideas; he teaches thinking. In such classrooms, his functions seldom have any direct relationship with the literary training he received in graduate school. The lack of training for classroom responsibilities is not just a question of subject matter: it is a question of pedagogy. Teaching literature is easy, especially at the elective level. The students are there because they choose to be there. But at the lower levels, the student is forced to take English. It is at those levels we need real teachers, people who know what they are doing, people who are professionals not because they took a few courses in literature but because they learned the tools of their profession.

I am not arguing for one moment that our teachers should not study literature in graduate school. I believe extensive background in a discipline is essential for the college-level teacher. In fact, I'm such a conservative I believe no one should be placed in charge of a college class who does not have a doctoral degree. I want our graduate English Departments to teach literature, and I want them to continue to produce scholars. I believe in scholarship. The American Ph.D. degree needs no defense. Its justification rests in the very high quality and amount of American scholarship. I don't want that achievement sacrificed. But I do not believe that we can turn out scholars who have no competence in the modern classroom nor do I think we can continue to ignore the radical changes that have taken place in undergraduate education.

If we play ostrich, as the graduate departments here and in most universities have been trying to do, higher education will not remain very high. If our academic departments do not begin to produce the kind of teachers our junior and senior colleges need, someone is going to take over that responsibility. Teacher's colleges are already beginning to do it. The training will emphasize what we have ignored—pedagogy—and subject matter will take second place. The effects upon the whole system of higher education, including graduate education which is dependent, after all, upon the colleges for its students, will be, I think, disastrous.

Another very serious effect of our refusal to face realities is already apparent at CUNY. The introduction of a Certificate of Continuing Service was the inevitable and justifiable culmination of decades of unfair labor practices at our universities and colleges. The poorly paid M.A.'s and ABD's who did the chore teaching had neither professional status nor job security. The practice was and is unfair. But in righting a long-standing wrong, an untenable situation has been created. More and more the departments of this University will be divided into the haves and the have-nots and no department of permanent staff so divided, can stand.

A college English Department has a multiplicity of functions. We do not teach literature alone; year by year we incorporate into our courses related arts and disciplines such as movies and psychology. We should have experts in every area that we teach, including composition. If we require a doctorate for one kind of expert, we should require it for all kinds. Every permanent member of a department should have equal professional status, and, no matter what his function, he should have an equal opportunity for advancement. Everyone should have equal, if not identical, qualifications or we shall be torn apart.

The CUNY undergraduate colleges are pioneering for the future. The CUNY graduate school also must begin to deal with present reality and look to the future. I believe the only solution to our problems is to establish alternate doctoral programs in English or, if the Ph.D. title is too precious to discard, alternate tracks for that degree. I also believe that this University should provide every lecturer who has dedicated himself to the kind of teaching Open

Admissions requires with the opportunity to earn a doctorate and thus open the door for future advancement.

Establishing such programs takes time, I know. Prejudices are deeply rooted, and it's a long, hard struggle. Every convert is in imminent danger of ostracism by his colleagues. At the present time when Ph.D.'s are going begging for jobs, there is much reluctance to face the real needs of the market place. Newly-minted Ph.D.'s are claiming that all they want to do is to teach freshman English and that they will be happy to spend the rest of their lives doing nothing else. They are, unfortunately, prisoners of their indoctrination, as well as untrained for the job. Once in a department, they will spend their time doing the scholarship that will elevate them to literature courses, give them professional status, and earn them the respect of their senior colleagues. An so it goes, the old merry-go-round will turn and turn.

I think adaptations by our CUNY graduate English Department must be made; but in the meantime, something has to start somewhere. I should like to tell you what we have been planning at City College that will enable us to transmit at the M.A. level, what we have been learning about teaching in a college situation where Open Admissions holds. About five years ago, the Department developed a ninety-credit Doctor of Arts program. The Carnegie Foundation was ready to fund planning very generously for the program but the idea was rejected at the Graduate Center. Still convinced that someone should be worrying about training the kind of teachers we needed in Freshman English, the Department devised a new M.A. program. This proposal, summarized below, is on its way to ultimate approval from all the necessary authorities and should be in full swing next year.

THE CITY COLLEGE OF NEW YORK

MASTER'S DEGREE IN THE TEACHING OF COLLEGE ENGLISH

Designed for:

(1) Those who plan to go into junior or community college teaching.

(2) Those who plan to continue with a Ph.D. or Doctorate of Arts degree for junior or senior college teaching.

Description of the Program:

9 credits of Pedagogy
(all under a master teacher)

1750 Introduction to the teaching of Basic Writing and Literature courses.

1751 Work in the Writing Center as a tutor.

1752 Thesis Project:
(Designing a Basic Writing course)

6 credits of Linguistics

1760 English syntax

1761 Social Dialects

3 credits of Social Dynamics

Grad. Psych. Dept.

6 credits of American Studies

1773-1774 Readings in American literature against their social, political, and historical backgrounds

15 credits

(a) In Literature (for the student planning to continue with the traditional Ph.D.)

(b) In Humanistic Studies (for the student who wishes to pursue individually tailored interdisciplinary programs)

* *

Total: 13 courses for 39 credits

We have increased the traditional 30 credits for an M.A. to 39. The 9 credits of pedagogy have been added to a course of study that would be acceptable as the first step toward a doctoral degree. The pedagogy courses are not primarily theoretical. The weekly seminars are related to practical experience in the classroom and at the Writing Center where the students work as tutors. Courses in Linguistics will provide sufficient form grammar to allow the graduate student to function effectively in a writing course, and will orient him to the special problems of the Open Admissions student. The Social Dynamics course is offered by the graduate Psychology Department and will help the graduate student to understand undergraduate students. The American Studies requirement is designed to introduce the student to interdisciplinary study similar to that found in the lower level courses.

I do not believe this kind of program is the ultimate solution to our problems because I believe that all our permanent staff should hold doctorates and have equal opportunity for advancement to the full professorship. But it is a step in the right direction. By the close of this program, students who go on to further study will have been oriented to the importance of teaching and will have had experience in the college classroom and it will be, for a change, experience not gained at the expense of our college students.

English Plenary Session: Conclusions and Proposals

Roderick Loney (Medgar Evers College):

Let us begin by directing our attention to what we have reviewed these last two days: this session specifically involves those in English workshops but, of course, you are all invited to remain. In the next few minutes I shall request Joan Baum, Beryl Bailey, and Stephen Weidenborner, all of the English Planning Committee, to present a summary of their workshops. Then, delegates will have an opportunity to ask questions, or to make additional recommendations.

I mentioned earlier that the purpose of this meeting is to draw up an inclusive set of recommendations that have emerged from, and during, the workshops. The results go to Dean Berger. Again, we want to establish a committee to implement our proposals and assume responsibility for developing suggestions offered.

If there are no other alternatives offered now as to procedure, I shall begin by requesting Joan to address us first.

Joan Baum (York College):

My statement is brief. I opened the series of interdisciplinary workshops with a remark that the recent CUNY **Courier** had a reprint of an instant jargon generator listing of "interdisciplinary" as eighth on the Richter Scale of rhetorical outrage. The word "interdisciplinary" means disciplines together. Our profusion of interdisciplinary ideas and procedures these past two days, however, suggests less of discipline in form, structure, and standards, and more of spontaneous, well-intentioned stimuli to achieve psychological and academic goals. The number of methods and materials in humanities, social sciences, speech, remediation in English composition and literature, individual teachers who function in two or more disciplines and those who teach in teams, suggest that our workshops complied with Vice Chancellor Healy's keynote charge to attend to "curriculum content" and to encourage "interdepartmental cooperation."

Our many discussions were often passionate, too, or, as this morning's **New York Times** reported of John Jay College, "a dialectic tension between two positions" that often makes for "lively discussion." If it proved not always to be clear that discussion was expressive of dialectic, i.e., a synthesis resulting from thesis and antithesis, there was always healthy discussion in feelings and opinions.

Beryl Bailey (Hunter College):

I despair somewhat of appearing at this point on programs where I am asked to summarize what has occurred before I have had the chance to assimilate the experiences myself. Today I am in a better position than at another recent conference where I was asked to give a summary in the morning of a conference which was to continue until three o'clock that afternoon! On this occasion I am a bit better prepared, if only because the summary was suggested to me in the final workshop on teacher preparation, a workshop that generated great interest among faculty and students.

Workshops on criteria for selection of Open Admissions faculty confirmed that each University unit has its own specific criteria with differing emphases when interviewing staff to teach in Open Admissions English writing programs. Professor Hortense Sarot, coordinator of the Basic Writing program at Hunter College, emphasized teachers with specific experience related to Hunter's developmental program. Among her specific suggestions were that new teachers regularly should attend seminars led by experienced teachers in the field, that they should be encouraged to develop innovative teaching models, and that a course of the psychology of teaching should be incorporated in their inservice program.

Professor Jennie Wells of New York City Community College stressed willingness of the candidate interviewed to teach Open Admissions students and the ability to demonstrate competence in the classroom. The discussion at this point focused on the means employed to determine class competence during an interview.

York College has no individual basic skills program and York's Dr. Alan Cooper emphasized that the entire department teaches the Open Admissions students. Dr. Alan Cooper considers full literacy the goal of Open Admissions: he decried the inflated grades of some students. His preference is for tradition, and for a traditionally trained teacher with a competence in literature.

Professor Howard Nimchinsky, chairman of the English Department at Kingsborough Community College, explained Kingsborough's integrated reading and writing program. The Kingsborough English staff, with traditional credentials, also considers new approaches.

In the afternoon, Professor Edmond Volpe, of City College, lectured on "The Graduate Literature Degree Vs. the Needs of Open Admissions Teachers." Professor Volpe asserted that the English program at the Graduate Center is snobbish in refusing to consider their graduates as called on to teach something other than literature, that the English Department of the Graduate Center disdains the teaching profession knowing little about education even as they assert they are teachers. This, in sum, is refusal to accept responsibility for meeting the changing needs of the student body. Professor Volpe also asserted strongly that no one should be permitted to teach in the college classroom without the Ph.D. degree, an opinion strongly attacked until he clarified his position. He advocated an alternate doctoral program, one which would be teaching-oriented and, for him, as valuable and carrying as much prestige as the current doctoral program.

This morning Professor Jack Wolkenfeld of Kingsborough Community College spoke on orientation and inservice training for English teachers. During his remarks he pointed out that, not only teachers for Open Admissions but those who teach general courses need ongoing training. We voted to incorporate inservice training, as suggested by Professor Wolkenfeld, into our recommendations.

Perhaps the most stimulating, as it was one of the most valuable, of our sessions was the faculty-student panel on the nature of accountability. In it I acted as "faculty": students spoke freely concerning their problems, what was happening to them in their classrooms, where they saw defects and needs for emphasis in current teaching. At 12:30, a student asked,

"Do we have to stop here ? Can't we go on with this into the next session? This is where the action is." No teacher attending this panel could have felt the value of his status fell because of that enlightening session.

Lastly, a number of us wrote what we initially thought would be "modest proposals." We found as we wrote that our discussions had made us incapable of modest proposals; we know that what needs to be done will be expensive for the Board. Our recommendations are 1) that the Board of Higher Education create a University-wide, interdisciplinary standing committee to design, establish and implement an inservice training program for the entire University to ensure academic development of all Open Admissions students. This committee should be interdisciplinary in nature, and should include not only regular faculty, but a specialist in institutional change as well: the specialist should provide requisite technical help for so complex a task. 2) Preparation of a handbook of practical guidance for all Open Admissions instructors. (The 1969 handbook, prepared just before Open Admissions, is antedated and unavailable.) 3) Establishment of a CUNY curriculum center as a repository for tested materials and methods and as a clearing house for generation and distribution of new information. 4) An intra-University exchange program between Community and four-year college instructors. 5) Strong support of a teacher-oriented graduate program modeled on the current program (including internship and practical experience) at The City College of New York. 6) Formation of a commitee to develop an alternate doctoral program at CUNY based on a curriculum adequate for the new college population.

Stephen Weidenborner (Kingsborough Community College):

The workshops in which I was involved were entitled Dynamics of the Classroom. We dealt first with styles of presentation when a teacher facing an entire class treated the class as a single audience. Our second session dealt with small classroom groups of three, four or five persons in order to facilitate learning through an increase of activity and participation by individual students. In the third session, which took place this morning, the Lehman College staff showed a number of approaches making possible utilization of affective resources of students to develop their skills in writing. This afternoon, our presentation showed how attention can be given to student needs in a particular classroom by the "supermarket approach" whereby students choose a writing deficiency for correction during class time.

Our two approaches were to teach the class as a whole or to break it into small groups, with a constant awareness of making the process work.

Is There a Right Way to Teach Mathematics and Is There a Right Mathematics to Teach?

LOUIS AUSLANDER
Department of Mathematics
The Graduate School and University Center

Let me start with what I wrote and as I speak, I shall probably enlarge upon my written statements. As I see it, the two worst problems occurring in teaching remedial mathematics are: the student who comes to class for a few days and then stops coming; and the student who has apparently learned some material and who, a few weeks later, has apparently forgotton that same material. We see these problems over and over again in classroom teaching. I think the most disheartening thing about teaching mathematics is the subsequent failure of the student with whom you worked very hard for one week. Just as you feel you are making some progress, he stops showing up. Another disheartening thing is to work very hard with a student over a period of weeks. The student learns a specific set of ideas, a specific set of techniques. He takes a test on the material and does very well. But when the same student is tested on the same material a month later, all that was learned has been forgotten.

These are two major problems remedial teachers in mathematics must face. These are the core problems that we have to deal with. I should like to be able to say, "in this talk I will tell you how to teach mathematics to solve these problems." But of course, such a statement would be nonsense. I don't know how to solve these problems completely, and I don't think anybody does. What I can do is to put these problems in context and suggest certain specific steps that a teacher might take to help overcome them.

I think the remarkable thing is that the research mathematician has many of the same problems in his lifetime that the remedial student has. Maybe we can use the research mathematician, who is obviously a successful learner of mathematics, as a guide to the teaching of remedial mathematics. Now this may sound extremely strange to you. It may sound like absolute nonsense. But I don't believe it is. So I will try to systemmatically present to you the striking analogy between how a research mathematician does mathematics and approaches problems and how we might better teach the remedial student.

The first question, of course, is why we require students to study mathematics. We don't actually require students to study mathematics. Society requires that students study mathematics to meet their future needs. They do not have an immediate personal need; we say they will have a future need. On the other hand, why does a person create mathematics? The answer is a felt need for a specific problem. There is no speculation about the future; the need exists right now. We notice that in both examples the word "need" occurs. Society requires a student to learn mathematics to fulfill some vague future need. Mathematics is created to fulfill a specific immediate personal need. I claim that tests and grades are introduced into the classroom as an artificial device to try to convert the vague future need into a personal immediate need. Tests and grades exist to mimic this need for immediate knowledge. You don't learn something for the future, you learn it for right now. In other words, tests and grades are artificial devices to try to create in the classroom the first step in the creative process, the need to know. And I claim that if all of us stop and think why we give tests or why we put pressure on students we shall see it as an effort to create an immediate need to know.

Research mathematicians use mathematics constantly. The artificial device we have introduced in the classroom to approximate the way a research mathematician uses mathematics is the exercises we assign to students. We think the more exercises the student does, the more he uses mathematics, the better we are educating. Yet, the artificial stimuli of tests, grades, and exercises, although they provide a useful replacement for creative stimuli, have one glaring defect. These stimuli often are construed to imply that a person is stupid if he makes a mistake. The quick right answer becomes the measure of success. And, strangely enough, this false measure applies to the teachers themselves. Most math teachers are afraid to make mistakes in class. When I was at Purdue, a man came to me, an older man. We had just changed calculus books and he was writing a notebook, and in the notebook was the soulution to every problem in the calculus book. We had a new calculus book so he had to write a new notebook. He was very unhappy that day because there was a problem in the new calculus book that he could not do. He came to me in the hope I could solve it for him so he could have a complete notebook with every problem done and not be embarrassed in class by having to admit, "Ah, there is a problem in the calculus book that I can't do." This fear of the wrong answer among students and teachers of mathematics is a very serious mistake. As we'll see later, making mistakes is an integral part of creating mathematics. You create mathematics through the process of making mistakes. By making no provision for them our devices have a serious defect.

The following story may help put the words "know" and "learn" in perspective. A young mathematician comes up to an older mathematician and says a certain result is true. The older mathematician replies that it is an interesting result and asks, "How do you prove it?" The young mathematician looks completely amazed and says, "But you proved that theorem yourself." The older mathematician had learned the theorem, yet he did not know the theorem. The reason is that the older mathematician had not needed to use this result in some time and so, quite naturally, had forgotten it. You don't remember everything, you only remember what you are using. This story raises the following questions. Should a student know a body of mathematics learned for some future need but used recently? Is it right to expect a student to know this material at all times? The answer is probably, "No." But the important part of the answer may be, what we really want a student to be able to do is to recover knowledge of mathematics, not to possess it at all times. If the younger mathematician keeps talking, he will find that his older colleague passes from a state of not knowing his own results, to a position where he can recall the training of thought that led him to prove the theorem in the first place, from there to an outline of the proof of the result, and usually, given a little time, to an actual proof. An inability to recover forgotten material sets the remedial student apart from the adequate stu-

dent of mathematics. Inability to recover material is what we see when we give a person a test on material a month later and he cannot do it.

Let us now compare how mathematics is created with how it is taught. Here the crucial ingredient is time. The mathematics we teach in a year was created over centuries. The more elementary the mathematics, the longer it took to create it. This may give us pause when we think of elementary mathematics as being easy mathematics. This need to telescope time has led many to think of mathematics teaching as putting existing knowledge into a student, rather than evoking mathematics. Again, an examination of the creative process may help us to put time in its proper perspective in the teaching of mathematics. In the creation of mathematics, what takes time is failure, the making of mistakes and the learning from our mistakes. It takes time and lots of going down wrong paths to find right examples that lead to right facts that lead to the right concept. It takes time when one has something one feels should work but won't. It takes time to see how to modify a good false argument to make it correct or to change a definition slightly to make it useful. So, in the creative process, most of one's time is spent making mistakes and learning from them. The payoff is the right answer. However, although the creative mathematician feels time pressure, he knows from experience that it will take time and effort to do something worthwhile. He expects to fail a great percentage of the time and to have enough ego to accept this failure and go on. What happens with the remedial student is that he fails and quits. There is the difference. There is no question about failure. Doing mathematics is a failing occupation—you fail most of the time. Yet in teaching mathematics, we seem to be trying to protect the student from all these failures, all this waste of time. There are books with the right way to do things. There are worked-out exercises. There is a teacher to show the right way. All wasted motion has been eliminated from the learning process. The mathematics that the student sees is always in the perfect state. It is always the smothest possible presentation. Perhaps it is so smooth that the student cannot get a grip on it. It is very very easy to pick up a rough object. It is very hard to handle a very smooth object—it gets slippery. Presentation of the right answer only is caused, you see, by the basic original defect in our artifical world! The reward for the quick right answer results from students' or teachers' fear of making mistakes in class. One of the consequences of our reward for the quick right answer is that we limit our ability to teach mathematics because we do not allow the vital ingredient in doing mathematics, which is making mistakes. We eliminate this part of learning from our teaching process. The learning process in mathematics consists of making mistakes and learning how to correct your own mistakes. I was asked the other day, "If you proved a new theorem, how do you know it is right?" And the answer is that you don't. It can often take months to know whether what you wrote down on paper is right or not. It is a very hard job to determine whether a proof is right or wrong. It is a very frustrating job, it is a very agonizing job, it is a very profound job. This part of mathematics, this idea of learning from mistakes, this idea of making mistakes, this idea that you can learn from your errors, we have eliminated completely from the teaching process. I claim that the student who stops coming to class after a few days is a student who has done badly in mathematics. That student has two choices. The student can accept failure or the student can reject the artificial devices we have been using to teach him mathematics and which he thinks of as being mathematics.

It is a great shock to all students when they leave college and go to graduate school suddenly to find that what you ask them to do in graduate school bears very little resemblance to what they were asked to do in college. Now this shock is very important. This is the first time they have done mathematics. It is what we want people to do. We don't care if they make a mistake the first time they do something, just so long as, in time, they can correct their mistakes and use the mathematics we are teaching them.

This fascination with the immediate right answer is a terrible thing. A student so addicted never sees a need to learn mathematics since he does not need to use what he is learning. To save self-esteem, the student won't play in our ball park. I claim that to teach mathematics to such a student, we are going to have to create a new ball game. We are going to have to motivate the student with something other than tests and grades. Standard exercises will not appear as an adequate use for mathematics to such a student. Let us now consider the remedial student who is willing to come to class. This person has also failed badly many times in mathematics. And I believe he is willing to study mathematics our way only because of the feeling that he cannot learn mathematics. I think many students who come to a remedial class have fixed in their minds before they walk in the door the idea they cannot learn mathematics. Therefore they are quite safe, their egos can remain intact. They no longer have anything to lose by playing the mathematics ball game as we are conducting it. If they do not learn something, they haven't lost anything. If they learn anything, they do not believe it and will soon forget what they have learned. It is imperative that the person be given a new approach to mathematics. We need to give them a new ball game to play so they do not start out a loser already.

I do not believe there is only one mathematics ball game that can be designed in which remedial students can play. However, I do believe that all these games will have certain ground rules in common. I shall first list these rules and then discuss them in some detail. The system must convince the student that he needs to know what is being taught in mathematics courses. You can't do this in the one hour lectures the first time the student walks into class and never shows up again. Somehow or other, some place, the student has to be convinced that mathematics is a necessity or become a dropout in a week. The classroom must be a supportive environment in which the student can succeed in doing mathematics. Ultimately the student has to be able to do mathematics without the support of the classroom. If the student can't do mathematics without the support of the classroom, we have not succeeded in our teaching. Society's failure to convince a student of the necessity of learning what we are teaching in the classroom is responsible for the student who stops coming to class after the first few days. I am certain that individual teachers or even departments can do much to cure this problem. The usual technique is to require a

certain number of courses in mathematics or a level of achievement in mathematics. This can force students to register for mathematics but it cannot make them attend their classes.

What we can do is not to add reasons for the students' feeling that they do not need to learn mathematics. We should not teach them exactly the same mathematics in exactly the same way that we did before and that they did not learn before. We should not say implicitly that the mathematics we are teaching is not worthwhile by withholding all credit for the course. Beyond these simple dos and don'ts, there is little that a teacher or department can do for the student who has chosen to reject mathematics to save self-esteem. In order to reach such a student, one would have to reorganize our educational environment totally and we could not be certain that even this would work.

Therefore we must ask how to reorganize the classroom so that the second type of student who comes to class feeling unable to learn, can succeed. Here I believe much can be done. There are five basic changes in attitude that will go a long way towards helping such a student to succeed in learning mathematics.

1) Remove the reward for the quick right answer.
2) Encourage students to work together in groups.
3) A few examples done carefully and slowly and in great detail are much more useful than many examples run through quickly.
4) Demand students do their best by conveying to them that the teacher expects them to try very hard.
5) The teacher also must convey the conviction that although failure is acceptable, ultimate success is expected.

This is a very difficult task but this, in essence, is the task of the remedial teacher. A classroom must be a place where the students do mathematics and not a place where they watch someone do mathematics. Tests must be a tool to teach students what they need to learn and not a technique for showing the teacher what they do not know. We must remove competition and the pecking order from the classroom. The classroom must be a place where a student can show lack of knowledge without being condemned for it. Indeed, the student must be helped by the teacher and fellow students to learn from mistakes. In essence, you see, if you allow somebody to make a mistake, and guide him carefully from the mistake to the right answer, you are providing the pathway which can be used in the future. The student doesn't know how to do the problem. On the other hand, if the student makes a mistake and you provide the right answer, you have not provided a pathway to the answer once the answer itself has been forgotten. And this is the reason for the student doing well immediately after learning something and doing badly a month later. You have provided no pathway from a failure to a success. This is a very serious defect in our techniques of teaching remedial students. Having removed competition and failure as our goals to success, we must replace them with something. You can't ask people to learn something for the future. You have got to give them something now. And it must be the teacher's driving conviction that they will succeed. There is nothing else that you can put into such a classroom.

This reorganization of the classroom is really modeled on what a research mathematician does when a hard problem arises he cannot solve and can understand only in part. First of all, the mathematician finds somebody, almost anybody, to listen. This may be a wife or husband, a friend or another mathematician. The mathematician talks about the problem, mostly to hear himself talk because, although recognizing it as probably nonsense, it is most important. This helps the mathematician by forcing verbalization of what he has been thinking. Hearing the words similarly, the mathematician can often admit the thoughts were indeed nonsense. In the same way working in groups gives each person in the class a chance to get outside himself and to hear what is being thought. Even more than this, it forces the student to think and do mathematics because there is something that must be said to the other members of the group. We have all seen the student who puts a blank piece of paper down, picks up the pencil and that is as far as it goes.

Lectures That May Seem Familiar

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INTRODUCTION

Perhaps because of the instructor's inability to perceive his own teaching flaws clearly, the American Association of Colleges of Teacher Education (A.A.C.T.E.) now requires each affiliated member unit to institute a well defined plan for evaluation of the teachers it prepares. Among classroom evaluation instruments for teachers at the outset of their teaching careers are micro-teaching and interaction analysis. Our emphases fall on specific, non-subject-matter behavior of the instructor, as illustrated in the following excerpt from lessons videotaped for presentation at the Third Annual Conference of the City University of New York (C.U.N.Y.):

Instructor: Am I late?

Class: Yes.

Student: Well, we really didn't know what to do. We waited and this is the last minute before we left.

Instructor: I'll tell you. I've got all kinds of headaches, you know. Lots of students come up to the office and they want all their questions answered at one time. I just don't have time to do all that. So I want to apologize for being a little late. Let's see, what are we going to talk about today?

To be late and to be unprepared are so easily recognized that we know these defects anywhere. So, too, are mistakes uncorrected on a blackboard and impolite forms of address ("You, back there," rather than specific and courteous identification). Less easily perceived are talking facing the blackboard, blocking visibility of the board, personal lack of grooming so striking as to disturb students. And, to the instructor himself, still less obvious—even in a videotape replay—may be omission of steps in a proof, digressions, undue dogmatism, and lack of recognition or attention to the limitations of listeners.

Our videotape transcripts, both on the same topic, review "The Bad Lesson" and "A Better Lesson." In the upper corner of the screen appear ten numbers, i.e., 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, all keyed to the ten Flanders Interaction Analysis Categories (F.I.A.C.). The system is designed to measure the classroom occurrence of certain teacher traits believed to produce self-confident students who are willing to do their own thinking.

The Ten Flanders Interaction Analysis Categories Follow:

Activity	Type of Interaction
1. Instructor accepts student feelings ("I can see you're upset")	Indirect Influence of the Instructor
2. Instructor reassures, encourages, praises student ("That's really a good way to look at it")	
3. Instructor probes student idea ("Let's see if this comment is correct")	
4. Instructor requests student response	Direct Influence of the Instructor
5. Instructor lectures	
6. Instructor gives direction	
7. Instructor self-justifies ("You should have learned this in high school")	
8. Student response	Student Contribution
9. Student Initiates	
0. Silence or confusion	

Why the Flanders Interaction Analysis Categories?

The typical C.U.N.Y. campus evaluates teaching performance by peer observation and/or student checklists. General research in the field tends to attribute equal reliability to the checklists, as long as the groups involved contain at least 25 students.

If students and colleagues think of us as "stimulating," it probably reflects a teaching style that facilitates voluntary interaction with course material involved. The coded classroom transcript, among inevitable 5's and 6's, probably has many 4's, 9's, and 3's. In a classroom which is "nonauthoritarian" and "understanding," recordings tend to show 9/1, 9/2, and 9/3 rather than 9/7 or 8/7 sequences.

Coding interactions and reading one's "tracks" are valuable means for self-improvement. Even to hear corrective advice during an observation conference—or to infer such advice from a student evaluation printout—often presents a difficulty in knowing how to make precise the place or places for modifying a teaching approach.

F.I.A.C. emphasizes classroom interaction by singling out for attention the dull, the direct, the unreceptive or the threatening lecture. In general, those who in their teaching rely heavily upon indirect influences are more popular with evaluators than those concentrating on setting forth the bare bones of the subject matter: emphasis on indirect approaches usually results in students of better quality. Their grasp on the material involved is more thorough.

To Use the Flanders Categories of Interaction Analysis

Since F.I.A.C. employs digital symbols alone, it can be learned the most easily of all coding systems of interaction analysis. The Flanders categories lack the observation detail of the similar systems of Edmund Amidon, Elizabeth Hunter, John Houch, and the A.A.C.T.E. staff. The Flanders categories, however, do focus attention at a specific point upon specific types of verbal exchange that enhance or diminish student goodwill.

To code a lesson, or a micro-lesson, is to insert the digit, as defined in the key and considered most appropriate, each time the observer identifies the relevant category. Time separation of code numbers, as recorded, may be two, three, or any accepted and convenient small time interval measured in seconds. In the following practice-sheet exercises, numbers identifying categories have been inserted in the text as object-guides in the first examples of two-second parenthetic breaks shown: you insert relevant category numbers thereafter in each unfilled set of parentheses.

Instructor Lectures: Student Responds to Questions

The lecture, Category 5, is more frequently coded than any other category: Lecturing is the most frequent form of classroom communication. Other frequently occurring types of verbal exchange are asking questions (Category 4) and student response (Category 8). An example of Categories 4, 5 and 8 follows.

Instructor: ...zero. Minus four times zero, Jane? (4)
Student: Zero. (8)
Instructor: Zero. Zero, subtracted from zero, Joan? **( ) [FILL IN]**
Student: Zero. ( ) **[FILL IN]**
Instructor: Zero. Zero is identical with zero. **( ) [FILL IN]**

When the instructor asks a question, record ____
When the instructor lectures, record ____
When a student responds to a question, record ____
Please fill in blank parentheses below:

Instructor: Twelve plus four is what, back there? ( )

Student: Sixteen. ( )

Instructor: Subtract four times four. Subtract how much? ( )

Student: Sixteen. ( )

Instructor: Sixteen. So, sixteen subtract (4) sixteen, is that zero? ( )

Student: Yes. ( )

Instructor: That shows that four is ( ) the answer to that problem.

( ) **(pause)** *(0) Isn't that beautiful? ( )* **(pause)** *(0) What do you think of it? ( )* **(pause)** *(0)*

Student: Well, I don't know. ( ) I can't see it too well. (9)

Instructor: You can't see it too well? (5!) Let's take a different problem. (5) Suppose I take the following problem. ( ) Let's say I want to solve the equation, ( ) x square minus...( )

Instructor's Self-Justification: Student Initiates Thought

In addition to his response, the student volunteered an original thought, Category 9. But the instructor continued to lecture. Of course, he could have done worse. To wince at students' treatment by instructors probably means that you are responding to Category 7 behavior.

Please fill in blank parentheses below:

Student: You just seem to be jumping around, (9) going from one to another, ( ) **[FILL IN]** *from three x plus one...( )*

Instructor: In elementary algebra, (4) did you study equations of this kind? ( )

Student: Yeah, but that was a while ago. (8 or 9)

Instructor: Well, I think you ought to know that. (7!) I think you ought to know that. ( ) If you studies this in elementary algebra ( ) it should be a part of your equipment. ( ) You should hove no trouble understandingit. ( ) There's no excuse for not understanding that, no excuse whatsoever. ( ) And I think you'll have to go home and study this ( ) because **(pause)** *(0) it's very important. (7) (0) Let's take another problem. (5)*

The exercise that follows contains Categories 4, 5, 7, 8 and 9.

Instructor: All right, does anybody have any idea ( ) as to how to solve this kind of an equation? ( ) (0) No one? ( ) (0) All right, back there, can you suggest anything about ( ) anything you can do with that equation? ( ) (0) Would you say to transpose the one to the other side? ( ) ( ) No response. Did you read the exercises I asked you to do yesterday? (4 or 7) You **didn't** *read the exercise I* **asked** *you to do? (!) What have you been doing? ( ) (0) I don't understand this. ( ) (0) We'll have to go through more details on this. (5) If you have an equation like this, ( ) the first thing you're going to have to ( ) try to do is to see if you can factor it. ( ) You know what I mean by factor? (4 or) (0)*

Student: No. ( )

Instructor: You don't know what I mean by factor? (!)

Student: No.

Instructor: Did you take intermediate algebra before? (7) Did you take elementary algebra before? ( )

Student: Yes. ( )

Instructor: And what did you cover? Did they talk about factoring? ( ) (0)

Student: Yes, but I was a bit confused. (9!)

The 0's represented above show a pause. Recall the other types in the statement of Categories.

Category 4: The instructor is ____ing.
Category 5 (the most usual): The instructor is ____ing.
Category 8: The ____ responds.
Category 9 (the other student talk category): The student initiates discussion.
Category 0: Silence or confusion.

And then there is unattractive Category—.

Instructor: Before you get into this course, you're supposed to know how to factor. ( )

Student: But I don't remember how to apply it to this. (9)

Instructro: Well, you certainly are ignorant of ( ) material which is prerequisite to this course. ( ) You really should have known more about this ( ) before you got into this couse. ( ) Otherwise, it is very difficult for an instructor ( ) to proceed—in particular, when one person ( ) doesn't know as much as the others—so, I'll show it to you this time, ( ) but I want you to do more studying at home. ( ) Two x squared... ( )

Instructor Gives Directions

In addition to behavior falling in Categories 4,5, and 7, an instructor's directions, Category 6, also exercise direct control over a classroom.

Instructor: Does anyone want to ask any last questions? ( ) **(pause)** *( ) That is all for the day. Please be (6) sure to study this material and bring in ( ) the first five problems from the chapter for tommorrow. ( )*

Instructor Probes Student Idea

Suppose, in addition to his response, the student expresses original thought. *Indirectly*, the instructor can exert his influence over the class by explanation, or analysis in greater depth, of the student-initiated train of thought.

Student: What do you do with it after you have the equation? ( )

Instructor: Now the question is, what do (3) we mean by solving a quadratic equation? (3) And that's what I'm going to do for you now. (3 or 5) I'm going to solve a quadratic equation ( ) of this type in the special case where c is equal to zero. ( ) What does that mean? ( )

Student: That means they're both zero. ( )

Instructor: That means they're both zero? (3) Must they both be zero? (3)

Student: Does it mean they're both equal? (9!)

Instructor: Both equal, or both equal to zero? (3) Are you asking the same question that Dave is asking? (3) Dave said that both of them had to be zero, (3) and that implies that zero times zero is the only way (3) to obtain the product zero. Is it possible ( ) to get a zero product by multiplying, say, zero times five and getting zero? (3)

Student: Yes.

Instructor: So, really...

Student: Oh, yeah! ( )

Instructor: ...we don't (3) need both of them to be zero. ( ) But we need at least one of them to be zero. (3)

Instructor Encourages (Praise)

Another stimulus to student participation is expression of appreciation for contributions they make (Category 2—encouragement).

Instructor: If I don't have an x term, isn't ( ) that the same as saying b has a certain value? ( )

Student: Yes, wouldn't it be zero? ( )

Instructor: That's good, Cecelia. (2) So i can...

Instructor Accepts Feelings

The third category of indirect influence is the verbalized acceptance of student feelings, Category 1:

Instructor: Dave, what's your question? Something's bothering you. (1)

Student: What happened to the extra zero? (9)

Instructor: You mean this zero? ( ) The main purpose for putting this zero here ( ) is to make both expressions look alike. (3)

Summary and Application of Interaction Analysis

The three indirect influence categories are praise (Category ____), acceptance of student feelings (Category ____), and probing of student ideas (Category ____).

Requesting responses, Category ____ straddles the direct/indirect influence borderline. The other direct influence categories are lecturing (____), giving directions (____), and self-justification (____). Of these the most frequently occurring is Category ____

When the instructor stops speaking, there can be silence (____), student responses (____), or student initiations (____).

You are now prepared to watch yourself or a colleague teach and analyze the classroom interactions. We suggest you begin with a five-minute recording which can be replayed several times.

Remarks About the New Mathematics

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I think it is rather good that my friend and colleague Ed Moise is going to be speaking after me because I want to be a little naughty and perhaps say some things that are complete nonsense. But then, I am a theoretical physicist and when I talk about mathematics I am never sure if I am talking nonsense or not. I am sure that after I have finished Ed will correct everything and put it back into shape.

Now, without further apology, I shall try to be somewhat outrageous even while I am being serious. While preparing this talk, I happened to be at a meeting at the New York Academy of Sciences and I asked various physicists there what they thought of the new mathematics. I was quite surprised, not only at their vehemence but also at their unanimity. They were all strongly against the new mathematics. Instinctively, I have disliked the new mathematics from the very beginning, and, having made up my mind, I decided to look at some of the new math textbooks. I was pleased to find that my prejudices were indeed confirmed, at least in my own mind. This process is so much better, isn't it, than looking at the evidence first and then trying to make up one's mind.

All that I have to say is concerned not only with the new mathematics for children but also with the whole business of teaching mathematics through the second year of college at the least. Let me begin with two quotations from Einstein that I think are particularly relevant to the teaching of mathematics. In a lecture entitled "Geometry and Experience," Einstein referred to the axiomatic approach in mathematics. He said, "as far as the propositions of mathematics refer to reality, they are not certain and as far as they are certain, they do not refer to reality....The progress achieved by axiomatics consists in its having neatly separated the logical formal from its objective or intuitive content."

The second quotation is from his autobiographical notes. Telling how as a youth he taught himself calculus, he wrote, "I had the good fortune to come across books that were not really particular about logical rigor but instead allowed the main ideas to emerge clearly." I think these are important remarks. They indicate how some important people approach mathematics.

In the new mathematics, it seems to me, there is altogether too much verbiage and jargon to no purpose. I do not object to the use of technical terms *per se*. But I do object to bringing them in for the sake of having some fancy words around. Let me be a little autobiographical. As a student, I could never keep the commutative, distributive, and associative laws distinct in my mind. I could just about remember what the word "transitive" meant technically. I was utterly confused by others. I never really got them straight until I had to use the words in teaching. Even now I have to stop to ask myself, "is that the distributive or is it the associative law?" I have no trouble with the commutative law, but there is a special reason for that. In quantum mechanics one uses noncommuting operators and so the meanings of "commutative" and "noncommutative" stick in my mind.

In the new mathematics students are supposed not only to know the rule that $a + b = b + a$ but also—and this is what I deplore—to know which one of the various words, distributive, associative, transitive, etc., is the name of the rule. The students are supposed to remember the names of many other algebraic laws, and when they use one they are too often required to give its name. It seems to me that all this nomenclature is not at all essential or even useful at that level. As long as the students know that the order does not matter when you add, they know the rule. Leave it at that. Do not make them memorize its label.

Further useless and obstructive jargon is introduced with the language of sets. For example, instead of saying "solve the equation," the new mathematics says "find the solution set of the open sentence," or, presumably for the sake of an almost lost brevity, "Solve the sentence." I would suggest that those people who approve of this go to their English departments and ask the professors of English what they think of those three words, "Solve the sentence." And then let them be moved to act accordingly.

There is altogether too much fussiness over precision in the new mathematics. For example, it seems to me that you do not need to make the distinction between a number and a numeral. Students understand it intuitively if you don't say a word about it. Once you start talking about it you bring up problems that would not have arisen if you had just been silent. I advocate judicious silence about a lot of topics that you could, of course, bring up as subtleties.

Let me quote Nobel laureate Richard Feynman on the subject of precision. He is an eminent theoretical physicist. He was asked to look at most of the new math textbooks and to indicate to the California State School System which ones he thought were the best. He was horrified by what he saw, and wrote a very long article about this experience. In it he says:

"One of the books on the new math pedantically insists on pointing out that the picture of the ball and the ball are not the same thing. I doubt that any child would make an error in this particular direction. It is therefore unnecessary to be precise in the language and to say in each case, 'color the picture of the ball' whereas the ordinary book would say, 'color the ball red.'

Feynman goes on to say,

"As a matter of fact it is impossible to be precise. The increase in precision to 'color the picture of the ball red' begins to produce doubt whereas before there was no difficulty. The picture of the ball includes a circle and includes a background. Should we color the entire square area in which the ball image appears, or just the part inside the circle of the ball? Coloring the ball red is clear. Coloring the picture of the ball red has become somewhat more confused."

Later he says, "this disease of increased precision rises in many textbooks to such a pitch that there are almost incomprehensibly complex sentences to say the very simplest things." You can easily confirm this for yourselves with a little investigation. Referring to the use of

the language of sets, Feynman shows its pedagogical absurdity by saying:

"A zookeeper instructing his assistants to take the sick lizards out of the cage could say, 'take that set of animals which is the intersection of the set of lizards and the set of sick animals out of the cage.' This language is correct, precise, set-theoretical language, but it says no more than take the sick lizards out of the cage."

So much for the remarks of Richard Feynman. I want to talk further about the introduction of the ideas and the jargon of sets into the new mathematics. I ask myself first, "Why do they bring in sets at all?" I do not see that anything is gained from it. On the contrary, I see that a great deal is lost. We are told that sets are very simple, fundamental concepts—so fundamental that you can build all other mathematical concepts on the theory of sets—and therefore that sets are ideal for starting a mathematics curriculum. I want, therefore, to show you some sets that I have brought with me in some envelopes. The textbooks say, rather airily, "a set is a collection of objects," and evidently assume that they have thus made the idea of a set clear.

Let us have a small session of show and tell. I have some envelopes marked A, B, C, etc. Each contains a set. Each, one might say, contains a collection—a stamp collection. Here is envelope A. It contains my stamp collection A. I open it. Look. Look. See my lovely stamp collection.

As you see, it consists of one stamp. I now ask you: Would you say it is a **collection** of stamps? I would be inclined not to say so. Nevertheless, the set theorists, having told us that a set is a collection of objects, tell us that a set can contain only one object.

All right. Let us continue. I have in my hand two envelopes containing two more sets: set B and set C. Both are collections of stamps. Stamp collection B is a collection of United States stamps. Stamp collection C is a collection of French and British stamps. Let us look at the contents of the envelopes. [The two envelopes turn out to be empty.] Here is set B, the collection of American stamps, and here—I must be careful not to mix them up because I tend to get these particular collections confused—is my collection of British and French stamps. There are about twice as many in the latter collection as in the former. How much am I bid for these magnificent stamp collections?

The student, having been told that a set is a collection, is then told in effect, "Look, what we find in envelope B is a lovely collection of stamps." And similarly for C. Since this really is not logical, it is likely to disturb students. It shows that the idea of a set is not at all as primitive and simple and obvious as some of the proponents of the new math pretend.

Let me go on to set D. It reverts to United States stamps. I open envelope D. I wonder if those of you in the back can see this collection. It consists of half a stamp. Now I insist that if one stamp is to count as a collection, and no stamps is also to count as a collection, then, for goodness sake, half a stamp is a collection of stamps, isn't it? But now, just when I, as a beginner, feel I have caught on to what set theory is really about, I am disoriented because suddenly I learn that half a stamp is not to be regarded as a stamp collection after all. It is a collection of half stamps, or a collection of molecules, or what have you, but it is not a stamp collection. Try to explain that to a student. I do not know whether the average student would be able to formulate his vague puzzlement in a way that would let him ask about this sort of thing, but it seems to me that we have here a real problem as to the very nature of the concepts that people are trying to use as the basis of the new mathematics.

Here is stamp collection E. This, you will be happy to know, is the last of my stamp collections. Let us look in envelope E. You will never guess what is in it. Look: two stamps, exactly alike. Now this is lovely. It is a real collection at last. Yes, it is indeed a collection. But now set theory does something strange. It says you only count one of the stamps if the two are identical. So you are told that this thing is indeed a collection, but it is really a collection of only one stamp, not of two stamps.

You are not always told that you must not repeat. On the contrary, there are occasions when you do repeat, and you say this is two things and not one. It is not very easy to get a firm ruling as to when you repeat and when you do not repeat. I sought out some of my younger colleagues in the Queens College Mathematics Department and asked them, "In enumerating the members of a set, when do you repeat and when do you not repeat?" What a wide assortment of replies I got! I have a feeling that if you asked a student the same question, he or she would not be able to tell you. I have a strong suspicion that many of the people who teach the new mathematics would also have great difficulty in giving a satisfactory rule. I am not absolutely sure that I could formulate a valid rule that would really satisfy a pure mathematician.

In this connection, I want to quote from a textbook to demonstrate the existing confusion about when you count equal things individually and when you count them as only one and avoid repetition. This book was printed in 1967. It is on modern mathematics and was written for school children by four distinguished authors and published by a leading publisher. In view of what I am going to say, I do not think I should be more specific than that. On page seven one reads:

"In identifying a set, you list each member only once. For instance, you write: {the letters in the word 'spool'} = {spol} even though the letter 'o' appears twice in the word 'spool.' "

So the authors are saying that if you want the set of the letters in the word "spool," you write {spol}. It seems to me that there is a crucial distinction here that they do not have the decency to make. They are so fussy about the distinction between number and numeral. Yet their present statement makes sense only if they are going to make a distinction between a letter and a literal, i.e. the symbol that denotes the letter. Otherwise, their statement seems to me absolutely meaningless; it is just like parrotting some arbitrary rule.

With this in mind, I now turn to page forty of the same book. There we see the following: A rectangle on the left containing three black stars and a rectangle on the right containing six red stars. The book speaks of "the two sets

{BLACK STARS} {RED STARS}

pictured" and it says that their union "contains exactly nine stars." Now, I wonder. On page seven, as we have seen, the authors say that if you have two things alike you count them as only one. Here we have three black stars on the left and six red stars on the right. Why should we not say that the three black stars on the left count as one star; and that the six red stars on the right count as one star? The fact that three of them are black and six of them red shows that they are not all the same. If the stars are not the same in the two rectangles, then the fact that they are all black in the first rectangle should imply that they are all the same there and therefore should be counted as one. I would be inclined to say that the union of the sets consists of two stars, one black and one red. But no. We are apparently not allowed to say that here.

I submit that trying to introduce sets in a formal way to youngsters can lead to great intellectual confusion. There is much more that one could say about the new mathematics. But time has run out. I think that I have said enough, anyway, at least to cause some of you to question the validity of the new-mathematics approach—and perhaps to cause others of you to question the validity of what I have said.

Problems of Course Development and Partial Replication

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I am going to make a few remarks in response to Professor Hoffmann, but I shall not answer in the same style, and I do not propose to accept the terms of the discourse. Professor Hoffmann's definition of the subject contains gross oversimplifications. He asks whether the so-called "new math" is good or bad. This is like asking whether Americans are good or bad. The term "new math" is applied to an immense variety of programs, some good, some bad, and some good in some ways and bad in others. To lump them all together is so crude an approximation to educational reality that it hardly seems worth discussing. Many of the flaws that Professor Hoffmann attributes to the "new math" are actually found in some programs but not in others. For this reason, I don't believe that anyone with any sort of critical intelligence would make a wholesale endorsement of the new mathematics programs, any more than he would make a wholesale endorsement of Americans or Albanians or blue-eyed people.

It is important, however, to understand that many of the ideas that Professor Hoffmann satirizes have serious intentions behind them. Consider, for example, the supposedly delicate distinction between numbers and numerals. This distinction was not invented by logicians or by curriculum reformers. It has long been established in colloquial English speech. Everyone speaks of Roman numerals. Nobody speaks of "Roman numbers," because we all know that the positive integers that the ancient Romans used were the same numbers that we use today. A distinction observed in common speech can hardly be regarded as super-sophisticated. I am not sure whether the distinction is worthwhile, in the teaching of algebra. Such questions can be answered only on the basis of experience. But the people who introduced it into algebra courses had something serious on their minds. In elementary algebra courses it is easy for the student to get the idea that x and y and z are little animals running around with a vitality of their own, and that so-called "literal numbers" are in themselves objects of study. The fact is that these letters merely mark the spot where numbers are to be inserted. Formulas involving variables are used in two quite different ways. For example, the equation $x^2 - a^2 = (x-a)(x+a)$ holds for every x and every a; this is a statement of fact. Yet when we write an equation like $x^2 - 5x + 6 = 1$, we are not making a statement. We are asking a question for what numbers x, if any, does the given equation hold? When you call such an equation an **open sentence**, you are reminding the student of the real meaning of the formula. When you ask the student to describe his answer as the solution set of an open sentence, you are insisting that the student have in mind the real meaning of the problem that he has solved. Getting the student to understand such things is a formidable task.

One of the worst hazards, at most levels of teaching, is that **the process tends to replace the problem in the mind of the student.** For example, the question whether the derivative of x^2 is $2x$ is not necessarily thought of as a question of fact. The process which replaces x^2 by $2x$ is thought of as one process among many, to be learned by drill; and in the minds of many students, the calculus is a repertory of routines rather than a body of knowledge.

The sort of explanation I have been giving is not enough to enable anybody to decide which, if any, of the pedagogic devices of the "new math" are effective. Such questions cannot be settled by plausibility arguments or oratory. They can be settled only by experience, because no adequate theory is available. But if we demolish straw men with oratorical flourishes, instead of discussing real issues, the results are not just inconclusive but worthless.

Consider, for example, the quoted remarks of Professor Feinman. My acquaintance with Professor Feinman's views and attitudes began about ten years ago, when plans were being made for the Cambridge Conference on School Mathematics. We were trying to avoid a bias in favor of pure mathematics, and so we invited many applied mathematicians and natural scientists. Professor Feinman was openly hostile to this policy. I have read the letter in which he declined our invitation. In it, he explained that what we were trying to do would slow down the teaching of "mathematical facts." He alleged—and I must say that I did not believe him—that such "facts" were all that his own knowledge of mathematics consisted of. It appeared that he was opposed not just to various new and misguided pedagogical devices, but to the whole idea of teaching mathematics as a science.

It is not surprising when people with unsympathetic attitudes turn out to have garbled conceptions of the ideas to which they are unsympathetic. Attempting to speak in the style of the "new math," Professor Feinman said: "Take the intersection of the set of all lizards in this cage and the set of all sick animals, and move this set to some other place." His parody, however, is misconceived. It shows that Professor Feinman does not understand what sets are. While lizards have locations in time and space, sets do not. Lizards can be moved but sets cannot be moved. There are certainly other people who drag the idea of a set into discussions where it does not belong, but Professor Feinman stands out among them.

Moreover, nothing is easier than to argue that something is unintelligible by furnishing an unintelligible explanation of it. I have heard John Kemeny attempt to prove by oratory that the idea of an ordered pair is unintelligible. He did this by stating a definition of the term "ordered pair," so technically and so fast that only those who already knew the definition could keep up with him. Of course, if this argument proved anything, it proved that analytic geometry is completely bewildering, because in analytic geometry points are continually described by ordered pairs of numbers.

I remarked at the outset that I objected not only to Professor Hoffmann's conclusions but also to the terms of his discourse. I do not believe that you can prove anything about pedagogy by delivering orations at a conference. Pedagogic ideas need to be tested by experience. It is worthwhile to analyze pedagogic problems from an intellectual standpoint, but we need to analyze them in detail and in particular. You cannot demonstrate general

statements by *a priori* reasoning or by rhetoric. If you analyze particular pedagogic problems, watching the responses of classes, then you may be able to infer some general principles that will help you later. But your knowledge of these principles and of their validity depends upon painstaking and detailed analyses. I assure you that my feelings toward Professor Hoffmann are entirely friendly. Neither of us is engaged in a personal vendetta. But I do wish that he would keep in mind that one of the rudiments of intellectual discipline is to observe a distinction between what you know and what you don't know. I am astounded to find a man of his intellectual powers taking a stance of authority in discussing a job that he has never done, namely, the job of teaching young children. [To Professor Hoffmann:]

Am I right? Have you ever taught on this level?

Dr. Hoffmann: Only my own children.

Dr. Moise: I don't think that that counts.

I shall now proceed to discuss what I originally intended to discuss.

The City system today faces a variety of problems, including, I believe, all those that any undergraduate college has ever faced, and including some new ones of remarkable difficulty.

The old problems are bad enough. I am not convinced that colleges in general do a very good job of teaching well-prepared and well-motivated students. Someone has remarked that there are no good teachers—only good students. I think that this is false, and that it is hardly more than a backhanded way of saying that good teaching is not as prevalent as it ought to be.

But the new problems, associated with Open Admissions, are more difficult than the old. The City—to its great credit—is attempting to offer a college education to a huge number of students who, under ordinary standards, are not prepared to enter college at all. Nobody here needs to be reminded that the difficulties presented by this task are formidable. I should confess at the outset that my own professional experience has not been of a sort which would prepare me to attack them. Thus I have no pat answers to offer. Therefore I shall attempt only to describe some of the dimensions of these problems, as I see them, and to describe ways in which the City system, as a matter of institutional policy, can help the people who are giving to our new teaching problems the sort of intensive effort that is required.

There is one pat answer that I think should be rejected out of hand. This is mechanized teaching, of the sort advocated by B.F. Skinner and his various allies. It seems to me that this is appropriate only for very special purposes and under various special conditions. For example, if for some reason we propose to teach spelling by drill, then it may be best to do this by machine. The point is that if a human teacher points out a spelling error, this is a negative event in human relations, while a similar complaint from a machine is not a human event at all. Thus, I believe, there are cases where the dehumanization of teaching has positive human value.

But I think that such cases are rare and relatively unimportant. Nearly always, it is the humanization of teaching that is needed. The learning process is by no means purely cognitive. It is simplistic to suppose that people remember what they are told, and remember the things that are explained to them clearly. Much more commonly, people remember the things that interest them, and understand the things that they enjoy understanding. Moreover, a vital aspect of education is the enlargement and refinement of the student's aesthetic perceptions. When the student is "turned on" by things that did not turn him on before, then real progress has been made, and if not, not. And these enlargements of perception are closely related to the student's value judgments. In educated families, value judgments favaorable to learning exert an influence starting in very early childhood. If early childhood has had no such effect, then the schools face a task which includes far more than the transmission of knowledge in a cognitive sense.

For these reasons, I believe that the City's teaching problem is in a vital way a human problem, incapable of being solved by mechanized methods. Teaching is an interpersonal relationship, and the more difficult the conditions may be, the more important its human aspects become. Teaching is a human activity, and it is an art.

But the art of teaching is developed and communicated in strange and not very effective ways. There are plenty of good college teachers, but nearly all of them acquired their skills by experience, working alone, with no significant help from anybody. Obviously graduate study makes a contribution to teaching competence: no person gives what he does not have. And, in fact, teachers of mathematics seem to give to their students much less than they seem to have, on the basis of their own past studies. Real competence in the teaching of mathematics, at any given level, requires in practice a depth of study which would seem to be grossly excessive. To teach elementary Spanish, it is not enough to have studied elementary Spanish; the teacher must really know Spanish. Similarly, to teach mathematics, one needs to understand mathematics as a science.

But while academic study is a vital prerequisite for good teaching it does not, in itself, contribute directly to classroom skills. Most college teachers have their first classroom experience as teaching assistants. Ordinarily their classes are visited by a senior faculty member about once a semester. Even for purposes of evaluation, these procedures are perfunctory, and their effect as teacher-training is nil. In effect graduate programs are conducted as if the student were going to hold post-doctoral fellowships for the rest of his life.

The same absence of communication persists among experienced professionals. As scholars, we form a community and we learn from one another, but in our capacity as teachers we form a League of Solipsists. Textbooks are generally useful, but even a very good textbook (when one can be found) is a crude approximation of a good course. We find a reflection of this fact in the frustration of "educational research" workers when they try to compare various teaching materials by means of test data. One of the roubles is that the test data are very unreliable; they may fail to detect any difference between educational outcomes which, by other methods, are seen to be grossly different. The other trouble is the problem of "factoring out the teacher." The experiments of which I am aware indicate that the skill of the teacher is overwhelmingly more important, in determining educational results, than anything else. So

far, we haven't found a way to enable teachers to learn the art of teaching from one another, and so the benefits of a superior teacher's skill are usually confined to that teacher's own students.

This communication gap is especially bad when innovative teaching is needed on a large scale. The City system needs innovative courses and methods. I have no doubt that these are being developed, in various classrooms all over town. The question is whether new and successful ideas are being put to work on a large scale, by a process of communication between teachers, and I believe that the answer is probably No.

So far, I have been describing a variety of problems, which have a feature in common, namely, difficulty due to a communication gap. I propose an organizational scheme which offers some promise of help.

Suppose that on a fair-sized campus a group of half a dozen people are faced with the same teaching problem, which they don't feel that they fully understand. The trouble may be that they are all inexperienced. Or they may be teaching at a level which is new to them, or teaching an innovative course, without knowing if and how various features of it are going to work. These three situations have a lot in common, and I think that they have a common remedy. The idea is for the group of half a dozen to work closely with one another, visiting each other's classes and conferring frequently on what they have done and seen.

I think that this sort of collaboration and consultation would greatly accelerate the learning process in the initial teaching experience, even if the group includes no experienced teacher. If a senior faculty member works with the group, so much the better. I am inclined to think that the scheme would work better if classroom visits by peers were much more frequent than visits by the senior adviser, and that in the "teaching seminar" the senior faculty member's participation was lowkeyed. That is, the beginning teachers should feel that they have an adviser and a consultant rather than a boss.

The same scheme could be used in much the same way in the development of a new course. In this case, the group would include the designers of the course, and the authors of the new teaching materials, and also other teachers, preferably experienced. Under these conditions, part of the job of the authors would be to explain to the other teachers what they had in mind. Part of the job of the other teachers would be to complain on occasions when the authors' ideas were not working. This collaborative effort seems likely to reduce three major hazards in course development:

(1) Innovative course design might be based on the theory of teaching, if there were such a theory, but there isn't. In practice, the development both of individual teachers and of course design proceeds by intuition, trial and error. Theoretical insights, when they occur, are based on creative efforts, rather than vice versa, in much the same way as in literature and art. Thus courses cannot be designed *a priori*: and the only way to find out whether a course works is to try it.

(2) Experimentation by authors is not enough. Notoriously, nearly all texts work well when first taught by their authors. Partly, no doubt, this is due to the class's perception of the author's enthusiasm, but I think it is also due to the fact that the author may remedy various deficiencies of his own writing by discussion in class, without being aware that he is doing so. Thus every author needs to find out what happens when somebody else tries to use what he has written.

(3) If the intent and method of a course are really original, the text materials may not convey them. If by any chance they are so conveyed, then the chances are that the text material is over-written and over mechanized, leaving too little to the teacher. (For these reasons, in the high school materials produced by the University of Illinois Committee on School Mathematics, under the direction of the late Max Beberman, the teachers' commentaries are actually longer than the student texts.) I think that most innovative text authors would find cause for astonishment, and often dismay, if they visited classes where their books are ostensibly being used. Good mass education depends on the partial replication of successful teaching methods; and I believe that this can best be achieved, step by step, by communication between individuals. As teachers, we learn very little from each other by discussion of generalizations. We need to discuss specific topics and problems, in the teaching of particular courses. Note that I speak of **partial** replication. We don't all teach in the same way, and we shouldn't try to. But we can learn from each other, and adapt the results to our own styles, personalities, and purposes.

I remarked at the outset that my own professional experience does not equip me to discuss the intellectual substance of the teaching problems presented by Open Admissions. For this reason, I have not attempted to discuss these problems. I believe, however, that the City system can do more to help the people who are working intensively on these problems, and to help others to propagate the results of their successes. The hard fact, I believe, is that the effectiveness of the system depends on the personal effectiveness of a huge number of individuals, and the progress of the system requires that this personal effectiveness be increased. I don't believe that there are any short-cuts, and I don't believe that there is any way for education to get rich quick.

Are there any questions?

Question: (inaudible) . . .

Dr. Moise: My failure to discuss computer science is due in part ot the fact that I know nothing about it. I agree that it ought to be taught, for a number of reasons. In the first place I have heard that it turns students on. Also, the content is important in itself. There is a third reason that may not meet the eye. One of the difficulties in teaching mathematics is teaching students the art of using language with precision, that is, the art of writing statements that mean, literally and exactly, what they say. As I understand the matter, one of the curious things about computers is that they do not understand syntactical errors; if you want a computer to work, you must speak to it correctly. This requirement gives us an impersonal way of imposing on students a sort of intellectual discipline that they might easily resent if it were imposed on them by human beings. I believe, therefore, that computer science has an unexpected contribution to make to intellectual development.

It is not easy to say where computer science should fit into the curriculum. It is my impression—and I am sure

that there are people here who can correct me if I am wrong—that a great deal of computer science can be taught to people who know hardly anything about mathematics. This means that it can be taught at almost any level. My hunch is that the time to teach computing is the time when the students know enough about mathematics to use a machine to solve a significant problem that they couldn't otherwise have solved. I don't know whether this is a decisive criterion. In any case, my failure to mention computing was not due to any lack of respect for it, or any desire to discourage its teaching.

Question: (inaudible) . . .

Dr. Moise: I think we should be very skeptical about the idea of teaching mathematics as a skill, for immediately utilitarian purposes, rather than as a science. In the first place, the student retains intellectual understanding. Rote knowledge goes through the head like water through a sieve. And, as a practical matter, mathematicians are much more useful than mathematics. One might suppose that the task of a mathematical consultant, in government or industry, is to answer the mathematical questions that people ask him. But according to what my industrial friends tell me, the process is often very different. Often, when a mathematician is asked a question, he will ask why people want to know the answer. When this is explained, the mathematician will realize that he has been asked the wrong question, and that what people really need to know is something different. Thus, in practice, mathematics is not just a body of knowledge, but a style of thought, a capacity to frame abstractions and deal with them. If we neglect this aspect of mathematics, in an effort to teach techniques with all possible speed, then we have probably made a bad bargain. If we find that to teach a given topic at a given level, we must teach techniques and neglect ideas, then we ought to wonder whether such material should be taught at that level at all.

Question: What's the evidence that knowledge learned by rote is not retained?

Dr. Moise: I'm going on the basis of my experience as a college teacher, which I think agrees with practically everybody else's. If you're teaching second year calculus and you expect the students to remember something in particular from first year calculus, you are usually out of luck. The residuum of first year calculus in the mind of the student is not a large body of information which is at his fingertips. It is a level of mathematical sophistication, of such a sort that a brief review and explanation will recall it to his mind.

Question: Lots of people remember things they learn by rote. (inaudible)

Dr. Moise: That is because they have used them. Latin and Greek vocabulary is learned by rote. I took 4th year Latin and 3rd year Greek as an undergraduate. My knowledge of Latin and Greek now is zilch. I think any experimental psychologist will tell you that the hardest things to memorize are nonsense syllables. The easiest Englist text to memorize is verse that scans. That is, the more apparent the structure, the more memorable. I am stating this as a general principle. I'm not claiming to prove it; and one of the things that I have been trying to emphasize this afternoon is that nothing is known, at least to me, in terms of general principles that can be relied upon absolutely. Nevertheless, my own experience as a teacher suggests to me that the things that people have learned by drill alone, they lose, and the things to be built on in later courses are the degrees of understanding and the degrees of sophistication they have.

Dr. Hoffmann: I wonder if I could make a remark there. It's probably true that people lose what they have learned by drill alone, provided they don't use it after the drill. And then I think that Professor Moise said that if you use it, you retain it. I think the moral here is precisely that we should drill students on the things that they're likely to use. And it is precisely there that I think drill is necessary because you teach them things they're going to use before the occasion arises on which they have to understand why this particular maneuver works.

I think in general we should realize that you have to drill certain things, not only in mathematics but in other subjects. For example, if you were learning modern Greek instead of ancient Greek and you went to Greece, you would find that the vocabulary you learned you then retained because you were using it.

Voice: May I make a comment? We seem to be discussing two aspects of mathematics and they seem to be getting mixed up. One is that mathematics is both an experimental science where you find things and you create things that you don't really understand. And after you have found these things and created them then they are formalized in a structure. I think both sides of mathematics have to be taught. I don't think you can teach just the structure of mathematics or just the experimental process involved in creating the structure. I think mathematics is both. Mathematics is a technique for finding new information. Once these proofs have been found they are formalized and condensed. I think it is very important that we teach the full range of mathematics—not just one side of it.

Dr. Moise: The vital distinction that I have in mind is the difference between mathematics as knowledge, that is, mathematics as a recognition of the truth, and mathematics as a collection of conditioned responses that are acquired by drill. Plenty of ideas are best learned informally. If you want to show that addition of lengths is commutative—and here I make no apologies to Professor Hoffmann—then I think a very nice way to explain it is to draw two segments, linearly on the blackboard, end to end, and point out to the class that if you stand on your head the length of the total segment is the same as it was before. Therefore, if a and b are lengths, a + b is equal to b + a. This is a line of reasoning which you would never find in Hilbert, but I believe that it is intelligible. If you want to show that multiplication of positive integers is commutative, you may point out that if you draw an m by n array of dots on a blackboard and look at it sidewise, the total number of dots in the array does not change. This turns commutativity of multiplication of positive integers into the recognition of a fact. It is not a formal demonstration—I think that formalism has often been overstressed, and when I talk about teaching mathematics as knowledge, I agree entirely with Professor Auslander. Knowledge of mathematics is not entirely formal, and some extremely loose intuitive perceptions are essential in mathematical work. They're necessary not only for immature students, but also in

mathematical research. Thus I believe the vital distinction is not between formalism and intuition, but between knowledge and conditioned responses.

Problem of Curriculum Development

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In September 1970, the Open Admissions program was formally opened here at the City University of New York after approximately six months preparation. We had to be ready with a comprehensive program for a wide range of students who, we knew, would enter with serious mathematical deficiencies. Much of the curriculum planned during those first hectic months has been seriously modified but much of it remains intact. The pressure of time made errors inevitable. Now, more than three years later,we must still work to bring our courses closer to the original goals of Open Admissions.

Ideally, Open Admissions should offer all New York City high school graduates an opportunity for a college education without establishing a revolving door policy that flunked out students in numbers equivalent to the additional students entering, or a curriculum that watered down the degree conferred. As general guidelines these goals are laudable, but how can they be translated into practice in math classes?

Necessarily, we must begin a discussion of means with a realistic picture of entering students. In general, the Open Admissions student has a short attention span, a poor reading ability, bad study habits, hostility to mathematics, a poor mathematical background that includes an inability to follow rules, a lack of intellectual curiosity. Each of these characteristics interferes with ability to learn, but none of these is fatal nor do they render a student incapable of learning mathematics. Other things, however, interfere with the learning process. The class structure itself interferes by combining students with different backgrounds and abilities, who learn at different speeds and have different motivations. In the same classroom a teacher simultaneously bores some and overwhelms others. To a degree, modification of classroom structure and teaching technique ameliorates these impediments to learning. As an example, we can use our classroom positively by creating in it a miniature society where learning has prestige. With students helping one another we can ensure that they learn math better than they could individually. If everyone works at his own pace in the classroom, we can overcome classroom heterogeneity by allowing those who have difficulty in getting started to learn procedures from their classmates.

Still modifying teaching techniques and classroom structures are not enough. Curriculum requires attention, too. As students' background gets more marginal, curriculum plays a greater role in student success or failure. Certainly, we would have little success in our remedial classes if we began by teaching about Hilbert spaces, irrespective of the excellence of our teaching techniques and our classroom structures. This is equally true about traditional arithmetic and elementary algebra; they are too difficult for beginning students. Because they are poor curriculum choices, they aggravate the negative characteristics of classroom structure, making them insurmountable obstacles to learning for many students.

The goal of our courses is to teach as much mathematics as we can while attempting to modify the student's negative learning characteristics so that he can learn increasingly more advanced mathematics. One of our overall teaching goals is to bring the student to the point where he or she can enter the traditional curriculum. This requires that we teach toward a specific key concept that, once learned, will give the student a deeper understanding of mathematics. Initially, the mathematics we teach will not be interfered with by the students' negative learning characteristics. At first we use only the mathematics and ideas beginning students can grasp, but we are always aiming at the key concept that contains a deep understanding of mathematics.

Specifically let me describe a curriculum my brother and I have developed. The goal of this curriculum is to teach how to find rules, how to follow rules, and how to use rules creatively. These are the key ideas that, once learned, enable the student to progress rapidly in mathematics. Our curriculum begins with something the student's negative characteristics affect minimally but that allows us to begin to modify them.

We begin with the history of mathematics and we work to make sure all the basic concepts are clear. We teach students to verbalize. We show them there are rules that underlie the number systems. We help them to begin to understand what it means to know something. Math history has a further advantage. It gives the teacher time to begin to know the class and to try to form it into a learning group. Student fear of mathematics is also reduced. Students understand that there are rules that underlie our number systems and they see they must know these rules. Thereafter, we proceed to arithmetic and simple algebra. By this time, two weeks after class has begun, students are anxious to learn what they think is real mathematics. Because they have become motivated we can teach arithmetic and algebra algorithmically which gives students practice in following rules and precision in reading symbols. The student gains confidence in his abilities because we ask no more than that certain rules be followed. We neither stress nor teach toward understanding, which would be a harder goal.

The third topic is flow charts and computer programming. The student must now accomplish a given task involving creative application of given arbitrary rules. We teach how to recognize correct handling of a problem and show the student how to test precision. We teach the student to make the method his own and to make decisions regarding clarity. The method restricts the student's flow chart to taks with only computer instructions and computer language basic. If another person acting as a computer can follow the flow chart the student has successfully completed the task. The skills taught in this section are relevant throughout mathematics, and a student who does creative work here also learns to rely on himself instead of the teacher.

Finally, we teach basic algebra, axiomatically. In order to firmly fix the new ideas in students' minds and to get them to work with mathematical symbols in creative ways, we ask them to put what they have learned into practice through rigorous algebraic proofs. This tests

whether the program has been successful and whether the idea of a proof of compelling certainty based on allowable operations has become the student's own. Certainly students who can understand and do rigorous proofs should be mature enough in the next course, or in a math lab to learn basic arithmetic and algebra.

The curriculum first described is very efficient. It builds concepts step by step. It avoids boring the students by switching topics. It constantly builds on what came before. Its realistic design allows each student to proceed at his own pace. By teaching important missing elements, it allows the student to unlock and to use knowledge that is already possessed. Thus, he can proceed very quickly in learning basic arithmetic skills. Finally, this curriculum teaches attitudes and techniques that will stand a student in good stead should he take any further courses in mathematics or any subject. Just as teaching rule following unlocks the door to mathematics, in general we should begin to look for other key concepts students lack, concepts that once learned will enable the student to enter the Western intellectual tradition. Teaching such concepts should be the ultimate goal of our Open Admissions program, and should be the organizational principle behind the development of our courses.

Curriculum Development for Remediation

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Before any intelligent curriculum can be developed, certain basic issues must be agreed upon. These issues are: Shall we adopt a psychology which postulates the *tabula rasa* principle as one of its fundamental statements? Or, shall we adopt a psychology which postulates that human beings learn in accordance with inherited organizational structures with learning a function of time? Shall we educate our students to serve their society? Or, shall we educate our students to serve themselves?

A real problem in contemporary education is the choice educators must make between the psychologies of the behaviorists and Piaget's theory. At present, the behaviorist schools of thought appear to dominate educational thinking, but Piaget's followers continue to impress educators and in some instances have caused educators to reshape their thinking about education.

The debate between such schools of thought is not new. It has been going on for centuries. Supposedly, it was resolved when Kant, as a result of his disagreement with Hume, wrote the **Critique of Pure Reason.** But what both Kant and Hume failed to realize was that, although both philosophers assumed their basic premises were based upon observation, they were, in fact, fundamental statements. Thus their philosophies were arbitrary and the debate continues, and, I might add, rather heatedly in some circles.

Without an underlying theory of psychology, any person who attempts to develop a curriculum for remediation is at a serious disadvantage. But how can there be an acceptable psychological theory until there is an acceptable philosophy? Thus, those of us now engaged in developing a curriculum for remediation are caught between at least two opposing interpretations and anything we attempt will be considered erroneous by at least one group.

The other issue I wish to bring to the attention of my audience is the question of why we are educating our students. Here we have two diametrically opposed schools of thought as well as a whole continuum of thinking connecting them. This is a very confusing state from which to develop a curriculum.

My opinion on this matter is that we cannot adopt extremes, but this is only my opinion. There are many who would disagree with it.

In summary, we need two basic issues resolved before we can begin to make sense as to what curriculum should be developed for remediation. Unfortunately, these issues are out of the control of educators involved in curriculum development. Thus while we who work in this area will have to continue to develop the curricula that we feel suitable for our needs, we must be satisfied with them on the basis of their observed usefulness without ever knowing whether or not they are actually appropriate.

The Modular Approach to Mathematics Remediation

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The principle of modularized (or "unitized," as we refer to them at City College) courses is simple: instead of passing or failing a complete course on the basis of a full term's work, and repeating the entire term in the event of failure, a student passes or fails smaller portions of the work, at more frequent intervals, and therefore repeats smaller portions when he fails.

In mathematics, especially, because of the sequential nature of so much of the material, it is desirable that a student be checked often to determine mastery of the previous material before continuing to more difficult material. All instructors have had students who fall behind early in a term and then, becuase of the pace of new work, and their lack of understanding of the previous work, never manage to catch up. Such cases ideally are served by having these students repeat the first month's work with a new instructor. In remedial mathematics one also encounters many students who are unrealistic enough to believe that they will learn all the necessary material "in time for the final." Such students rarely manage to do so, however, and are better served by having a "final" early in the term; reassignment to the previous unit of work provides a shock that is often beneficial to these students. Finally, students whose real need is only a review, or whose ability to learn mathematics is above average, can accelerate more readily by passing extra unit tests from time to time rather than exempting entire courses under a conventional full-term-course system.

In summary, then, a unit system provides substantial flexibility in the pace of instruction, and accommodates both above-average and below-average students without sacrificing the essence of traditional classroom instruction.

The major disadvantage of a unit system seems to be the vast paper work involved when math department personnel attempt to serve a registrars assigning students to appropriate units of work, keeping track of individual progress in each unit, and informing students of their scores and new unit assignments. Anyone wishing a detailed demonstration of how the department at City College has handled these problems should call Professor John Miller or Professor Gerald Weinstein at 621-2348 and arrange for a visit.

Another potential problem with a unit system is that maximum advantage in terms of individualized pacing is evidently realized only when a **sequence** of courses is unitized. Otherwise, a unit saved is lost at the end of the term, and a unit lost results in a full term lost. The City College unit system involves 3 courses, covering elementary algebra (at a rapid pace, assuming that the student has some previous familiarity) through trigonometry and precalculus. Each course is broken into 3 units: the resulting 9 units include 5 of algebra, 1 of geometry (relationships and calculations but no proofs, 1½ units of trigonometry, ½ unit on the notion, notation and terminology of functions, and 1 final unit which is called precalculus but which is really a review of algebra emphasizing those techniques which have been observed to cause difficulties for beginning calculus students.

A student enters the unit system either by passing a prerequisite course or by placement on a placement test. These crude methods of placement determine only the **course** for which a student should register. At the beginning of the term a unit test is given which serves as a make-up for students who failed that unit at the end of the previous term, and also a more precise placement test for students new to the unit system. Students are also informed how to take more than one unit test at the beginning of the term, so that those dissatisfied with their placement can move ahead immediately if they already know the additional material. By the time that normal instruction commences, students are distributed through the sequence of units.

At the end of the sequence of unitized courses a problem arises because students do not necessarily complete the sequence at the end of a term, but may finish either 1/3 or 2/3 of the term. This is satisfactory for students taking a unitized course as a terminal mathematics course, but the primary concern is for those who plan to continue on to calculus. When registering for the last unitized course, a student's record in previous unit courses is scrutinized. If the student has previously passed either 2 units of the last unit course or passed 1 unit of the last unit course with grades averaging 80 or better that student is encouraged to register for a special calculus section meeting 2 extra hours per week with no increase in syllabus. Here the instructor uses the extra time to work with these students on gaps in their previous knowledge causing them difficulties in calculus. Thus almost no students finish the unit sequence with 2/3 of a term remaining unoccupied. For those who finish with 1/3 of a term remaining, a special unit in computer programming has been offered, to which student response has been enthusiastic.

An objective measure of the effectiveness of the unit system *per se* is difficult to obtain, since syllabus revisions, changes in hours and other changes affect any assessment. A questionnaire distributed to students involved indicated that 82 per cent preferred the unit system to the conventional approach.

Remaining difficulties include textbooks, which somehow never seem to be satisfactory, and the intractable problem of inducing students to reveal their weaknesses in such a way that an instructor or tutor can discover what help they need.

The proposed next step is development of a set of workbooks and supplemental computer-aided instruction packages so students can be tutored without having to reveal their weaknesses to a human tutor or instructor. With this step, computerized testing should be instituted, to ensure testing available at the convenience of the student rather than at the convenience of the department alone.

An Open Discussion on Mathematics Education

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Often when listening to discussions involving people with differing views one is struck by the seeming insolubility of the situation. No one will set forth his underlying assumptions and consequently the real points of contention are missed. Only if and when the participants state their fundamental assumptions is there a chance for dialogue.

Regrettably, a lack of dialogue is common among mathematics educators. There is a full spectrum of opinions regarding the most effective teaching styles and techniques, and what should be the curricula appropriate for each school level. Discussions arise about the superiority of formal over informal instruction. Pseudo-arguments appear concerning whether we should teach skills or concepts, as if these were mutually exclusive. These differences, and a great many others, can only be resolved by a deep, candid look at some of the most basic of the underlying issues, issues most often ignored: What precise goals should education have, and specifically mathematics education? How do we decide the criteria for effective teaching and how do we judge which instructors satisfy them? Should we develop a humanistic approach to mathematics education and if so, how do we go about it?

Before setting up any curriculum it is essential that specific educational goals be formulated precisely. Thus it seems odd and unsettling that this as yet has not been accomplished in mathematics programs for Open Admissions at CUNY. A prime example of this lack of decision on goals is manifested in remedial mathematics courses. The question arises as to whether one should prepare only the best students for the calculus sequence when teaching algebra and trigonometry, or attempt to raise the mathematical level of competence of the majority of the class. It is noteworthy that most students subsequently take "liberal arts" mathematics courses that have little relation to algebra and trigonometry, while considerably fewer will go on to the calculus sequence where algebra and trigonometry are prerequisites. We must first determine our educational goals, then decide at which time each is appropriate, i.e., general curricula or truly specialized curricula. Courses and course sequences should be revised to fit these decisions.

Although much is spoken and written concerning teacher effectiveness, there really are no open conversations to determine the criteria for effective teaching or how to judge whether a particular instructor meets these standards. One is afraid to speak up for fear of the Inquisition; one must adhere to the One True Belief. If we truly desire improvements in mathematics instruction, we must separate departmental politics from evaluation of instructors. One step in this direction would be to separate the procedures concerning promotion, retention and tenure from the mechanisms for improving instruction. One observation for the purpose of improving instruction and for professional advancement is inconsistant and allows arbitrary evaluations to be made. Perhaps these ideas will be of use: mutual observations and discussion programs could be instituted to determine criteria of effective teaching and the establishment of objective mechanisms to judge how well a particular instructor meets these standards. These discussions should be truly open so that differing views can be aired without fear of repercussion. Instructors can be safeguarded further from arbitrary judgment by having observers picked at random from the mathematics department of other institutions.

There is a wide spectrum of views regarding many facets of educational philosophy. However, most instructors would agree that their prime goal is to widen their students' horizons. One would therefore expect a benevolent attitude on the instructors' part. However, and this is an enigma, the impression one receives upon first entering a classroom each semester is hositility. One gathers the students feel a "cold war" is in progress with them on one side and the instructor on the other. Is this so very far from the truth? Rather than ignore the situation, as many instructors do, or try to coerce the students into unilaterial change of their attitudes, as attempted by many other instructors, it behooves us carefully to examine this antagonism. Perhaps the instructors' attitudes are not so benevolent as one might hope. Clearly this situation should not be permitted to continue; it seriously inhibits both the effectiveness of instruction and the joy of the learning experience.

Thus it seems incumbent upon us to examine closely our own attitudes towards teaching and towards our students. Rather than looking at the teaching of mathematics as a purely deductive science, as do many mathematics educators, albeit often unconsciously, we should regard it as it truly is, part empirical science, part art and only in part deductive. Perhaps a humanistic approach to mathematics education would give us an invaluable start in seeing some of the basic difficulties in mathematics education.

It is necessary that we first create a stimulating learning environment, one anxiety-free for students and instructors. An instructional style less rigid than the traditional formal method of teaching mathematics would be an improvement. The candor and flexibility of the instructor also would go a long way towards improving the climate of teaching.

Perception is in the mind of the beholder. Not until the instructor can see himself and his material through the eyes of his students will he begin to comprehend how students perceive. Only then will he be able, consciously and consistently, to create the proper impressions in his students. There are several ways to attain this goal. One is the use of common language, which has the added advantages of lessening student suspicions, helping students to learn the more formal mathematics terminology, and also removing a considerable barrier between the students and mathematics. It is curious that professional mathematicians frequently use an informal language when discussing mathematics among themselves, but restrict themselves to a rigid formal language in a classroom of neophytes.

Properly eliciting, recognizing and using student feedback is another way to help the instructor understand student perceptions and conceptions. Although this is-

sue is often bantered about, it is seldom actually attended to. Quite a few instructors are in too much of a rush even to answer student questions, whether in the classroom or in the office. Others ask the students questions, but make no real effort to elicit the proper response from a student if the initial answer is wrong or not immediately forthcoming. Do they really wish to obtain feedback?

One successful method used to obtain feedback is to ask each student, without self-identification, to write on a piece of paper every week what he feels was gained from the week's instruction and how the instructor could be of aid in getting even more from the class. The instructor will be pleasantly surprised by the insight and candor obtained. Another method is continual student evaluations, whether through quizzes, conferences, or other techniques. This not only tells you the students' progress in the course, but in addition gives the students self-confidence through frequent reinforcement and consequently achieves confidence in the instructor as a benevolent person.

Hopefully, we now begin to realize that there are no simple, quick, permanent solutions to the problems we face in mathematics education. However, we should realize that the only way to tackle these problems is through a willingness to set forth our basic assumptions and openly to thrash out the best approximation of the truth currently possible. Nowhere is it intended to assert that the issues discussed here are the only underlying issues, or that their surfaces have even been scratched. One only hopes it is now clear that if we sincerely wish radically to improve mathematics education, questions about the purpose of mathematics instruction and the relationship between instructor, student and subject must not only be posed, but thoroughly discussed in a spirit of genuine candor.

Subverting Passivity: Exercises in De-alienating the Mathematics Student

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Instructors complain about student complaints: "Is this going to be on the test?" "What do I need to get a 'B'?" "Why did I lose so many points on this answer?" The instructor's lament, the student's obsession with tests and grades is an obsession which the instructor feels is irrelevant and hopelessly unproductive. The student is urged to get on with mastering the subject matter and not worry about the grade.

And then the instructor proceeds to give tests, and to grade.

Obviously, the tests are going to determine the student's grade, and the grade is going to determine the student's destiny. Students would be made to ignore this reality. For it is apparent to the student that in spite of the rhetoric, the instructor is much more concerned with testing and grading than is the student; testing and grading is a free choice for the instructor, a painful and hypocritical process for the student. At best, tests have minimal educational content and they terrorize the student into doing assignments. At worst, they corrode any authentic connection with the subject matter, they deform the material by encouraging teaching towards the test. In every case, they are weapons used against the student and for purposes entirely alien to him.

This much discussed issue has led teachers to take one or another stand, depending on complicated sets of mental attitudes. Some of us oppose traditional testing and try to undermine the practice. Some of us insist that testing is virtuous. And those of us who believe the whole debate is fruitless go along with testing as the easiest, the least dangerous course. The questions associated with testing—and, *a fortiori* grading—are divisive. Not to choose is to choose by default.

Testing and grading policies have become polarizing in the educational community because of the view that to test disrupts the organic process of learning. We test in allegiance to abstract standards; we test in order to satisfy administrative requirements, and we test in order to assure ourselves that what we teach is real and objective and that we are transmitters of cultural substance not of caprice. These reasons are all meaningful except that adherence to them makes the student invisible. The student as a living presence becomes a remote reality, more acted on than acting.

Tests do not serve the student directly, they are not thought of as integral to the learning experience. It is axiomatic that the test does not belong to the student. Yet returning the test to the student may have far-reaching consequences.

Testing and grading is, of course, only one aspect of the course morphology, and components in educational situations that so function as to render students inert. It is vital to recognize that these components are not in themselves injurious; testing, for example, is not inherently damaging. What is at fault is the use to which testing has been put. Far from being destructive, testing can be so dynamic a part of the student's life that, once in possession of its essence, that student can transform it into a continuous activity. That is, the test will achieve its rightful position as a beautiful and forceful cognitive instrument. Perhaps some examples will demonstrate the practical implications of these observations.

Example I: The Student as Teacher

Folklore has it that a subject is not truly understood until one teaches it. Any number of theoretical formulations can be invoked to defend this thesis such as the fact that truth and meaning are inseparable from their structuring, for instance, or that subject matter inhabits a social, intersubjective realm realized only through human interaction. Most teachers come to a fine understanding of the subject they teach when they teach it. What is extraordinary is that the near universality of this experience has not led us to devise ways to exploit the phenomenon in the classroom.

During the Summer Kingsborough Community College EPDA (1972) Institute, we divided the class of 25 freshmen into 3 groups of about 8 each. Groups A and B spent an hour with an instructor learning a unit of liberal arts mathematics, in this case some modular arithmetic. Group C, during this time, occupied itself with another activity. During the second hour, group A taught the material it had just learned, 1 to 1, to group C, while group B drilled and practiced this same material. The results could have been predicted. Group A performed dramatically better than group B, and by any criterion achieved much more. Happily, group C's performance was below group B's confirming our belief in our own indispensability.

All kinds of lessons are to be learned; drilling is inefficient, teaching is learning, and so on. It is manifestly difficult to see how to incorporate these insights into our instructional schemata. Still, the essential message is clear. A passive learner is a bad learner, perhaps not a learner at all.

Example II: The Classroom Commune

A natural fragmentation occurs in the classroom. Student opposes student, competitiveness and suspicion saturate the atmosphere. Not much can be done about it in the academy; it is a reflection of the atomization that takes place in the ambient society. Testing is an area where student isolation is characteristic. Very unreasonably, we encourage students to become enemies of one another. Think for a moment of the antagonizing effect of grading on a curve which we normally believe to be an enlightened procedure. Nothing could be more destructive of class cohesion.

Once during the course of an experimental class, again at the freshman level, an attempt was made to introduce integrative formats in testing. One such test was on the subject of transformation groups. The class had spent something like six hours studying the group of the square, learning to construct the group table, solve group equations, visualize the material using cardboard figures, and discuss some of the poetic and philosophical content that inheres in the subject. Thereafter, they were tested as a collective. The class was asked to construct the group of the equilateral triangle, establish the table, solve some

equations, verify the associative law in a few cases and locate some subgroups. It is impossible for any one student to accomplish all of this in fifty minutes. But the ground rules allowed for full cooperation. The work had to be rationally distributed among the members of the class with a condition that everyone would receive the lowest grade achieved by a member of the class. This is quite an incentive for students to help each other, to accept a mutual responsibility, and to make sure that no one is abandoned.

Students are badly prepared for this game. They have no experience in collectivization on an academic level; they do not know, spontaneously, how to parcel out the work, how to coordinate efforts. It takes a long time for them to accept the (admittedly manipulative) procedure. Eventually they accept it, their performance improves, and a sense of communal solidarity is generated. There are a variety of aspects to generating this supraindividual consciousness; students analyze test results, diagnose and devise remedies for deficiencies, either local or global, and they can do these things collectively. Students learn the quality of concern for cognitive endeavors, though 'learn' is hardly the way to put it since the faculty of cooperation appears to us primordial. The student estranged from the learning process is a datum of our experience, but not a datum of nature. Whether one accepts this principle or not, it can be argued that the sense of community is essential, for otherwise activation of one sector of the class will lead to demoralization of another.

Example III: The Classroom Dialectic

Abandoning the cynical application of testing frees us to see how the operation can proceed as a student instrument. Testing indicates the degree of understanding of a concept as it applies to the reality for which it was created. Testing is at the heart of cognition and knowledge impossible without it. A student's comprehension of the extent of that student's grasp of an idea comes precisely through the exploitation of that idea. If grasp is adequate, the idea is nuanced, refined,deepened,linkedto other ideas, and the process is repeated on a more significant level. With grasp inadequate, the idea as it resides in the student's mind, as the situation requires, must be altered or mutilated or altogether destroyed. This activity takes place continually, and, if nourished, passionately.

In a lesson in numeral systems, the instructor motivates the subject in any one of a dozen pleasant ways, for example via the Hindu game NIM, which requires some knowledge of the binary system. (NIM is a two-person game, each player confronting in turn a number of piles of sticks, with a variable number of sticks in each pile. In turn, the player can pick up one or more sticks but from one pile alone. Last person to pick loses.) The students are aware that introducing NIM is a subterfuge, yet they like the game and want to learn the strategy, especially if the instructor plays against the members of the class and, naturally, wins.

The lesson proper begins, basic notions are introduced by the use of standard gimmicks, the shepherd counting sheep, etc. In a three-fingered world, i.e., using base three, decomposes into

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Everyone knows the technique: it is a good device and the key ideas are made perfectly transparent. Of course, it comes as a shock to the student who would have understood it better at the age of eight than at eighteen. With the presentation a flowing one, with the instructor in top form, eloquent and hypnotic, the instructor's temptation to continue in this vein is almost irresistible.

The lesson, however, is supposed to serve students not the ideal of oratory. A new idea has begun to emerge, and there is a reality to which it applies. What could be more natural than introducing a 'test' at this moment? The student is asked to decompose the array in a two-fingered, a five-fingered, a ten-fingered, a twelve-fingered world. The phenomenon 23TEN = 212THREE = 43FIVE = 10111TWO = 1ETWELVE becomes, not something passively received but an active achievement. Because it is born of the union of idea and act, it is much more the student's own than if that student presided at the awesome spectacle of an inspired instructor luminously showing forth the subject as if it were an inaccessible monument to civilization. It is absolutely imperative for the instructor to allow ego to recede if that of the student is to advance. And this is what must happen, *mutatis mutandis*, throughout the lesson, throughout the course.

Towards a New Orthodoxy

We could go on multiplying examples indefinitely. It might even be beneficial to do so, cataloguing an arsenal of techniques and permitting us mild readjustment of our traditional perspectives. Orthodox teaching has not been totally disastrous. While it has not worked well with one part of the student population, it seems to have worked well with another. The situation is analogous to that of classical physics at the end of the 19th century, adequate to one range of phenomena but not in accord with another. Just as special relativity generalized classical mechanics, and reduced to it in the limit, what appears to be required is a new orthodoxy powerful enough to overcome the failures of the old, and, where the old is appropriate, reducible to it. Developing such a new orthodoxy would obviate the need for ad hoc examples like those given here. A new orthodoxy would generate such examples as a powerful axiom system generates theorems. New techniques, new approaches, the resolution of our ancestral conflicts would follow irrespressibly.

Consider, as an illustration, the axiom of ownership: the classroom belongs to the instructor, it belongs to the school, it belongs to the state...we constantly hear instructors refer to the classroom as judges refer to "their" court. A modification of this axiom, either abolishing ownership or returning it to the citizenry, i.e., the students, has too many corollaries to list. Our examples are among them.

One should not be prejudiced against the concept of a new orthodoxy, but we are not likely to see its arrival in the near future. It is not that we lack educational Einsteins; there are numerous intellects in mathematical education that could effect that transition. The problem is, first, that the old orthodoxy, the one that currently imprisons us, has never been clearly formulated, so that a

systematic critique is a long way off; and second, crucially, orthodoxies old and new are not about simultaneity and moving trains. They deal with people.

Can the existing axiom for contemporary education exist with only minor changes? In other words, is there a genuine crisis? We are going to proceed towards dealienation one way or another. Ultimate clarification certainly will not come from pure contemplation. It will come from practitioners. Students are not objects, they cannot be indefinitely manipulated: their needs are real and urgent. A new theoretical framework will have to be created or we will be discussing testing and behavioral objectives and motivation and everything else forever with no sense of progress, no breaking through to deeper layers of meaning in our work. Such a framework must be created in the arena where students and instructors interact.

We are charged, it seems, we have charged ourselves with a critical mission, and one that cannot be transferred to others. Perhaps some cosmology can be done with Newtonian physics alone, and perhaps some good teaching can occur with only the current orthodoxy. Such a self-imposed limitation, however, would be an act of violence against our professional selves.

Teaching Mathematics in Modules: The Staten Island Community College Experience

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Staten Island Community College initiated its modular approach to remedial mathematics when Open Admissions began three years ago. The original plans were drawn up by Benjamin Greenberg, Sidney Richard and myself; and the program has developed steadily under the direction of Leon Ablon, who has written a thorough description of it for the *American Mathematics Monthly*.[1]

In this talk, I would like to describe the situation that led us to try a modular approach, our initial program, the lessons we've learned in three years and the modifications we have made in the program. At the end, I would like to discuss our evaluation of the program and the future of the modular approach to teaching mathematics at S.I.C.C.

Background: Our Students

A basic problem that we faced in designing a remedial program for our college was the tremendous diversity among our entering students. S.I.C.C. offers a full spectrum of career and transfer programs. The degree of individual preparedness of the students entering any one of these programs varies a great deal.

From the Math Department's point of view, students can be divided into three general categories according to their major field of interest. First, there are a large number of students entering the college intending to graduate in two years time with an Associate Degree in some technical area, such as Electrical Technology, and then to go immediately to work. Most of these students are required to take at least a pre-calculus course and a technical calculus course. However, a large majority are not prepared mathematically to enter the pre-calculus course. The second group of students consists of those who intend to study pre-engineering or a science. These students plan to transfer to senior colleges and most of them must take the standard calculus sequence. Many of them, but not all, also enter with deficiencies in mathematics. Very few of these students are aware of the effort that will be required to achieve their chosen career goal. A good number of students starting in one of these first two categories shifts to the other in the course of their studies. The last category of students are in the nonscientific liberal arts areas. Until recently, liberal arts students were required to take two terms of math; however, they could take courses that did not involve much algebraic or computational work.

Background: Our "Approach" to Remediation before Open Admissions

Prior to Open Admissions, the Mathematics Department did not teach remedial mathematics (i.e., pre-pre-calculus) courses in the regular day session, although we did offer some courses in our evening session modeled on the usual high school courses in elementary algebra, geometry and intermediate algebra. Students were supposed to enter with at least $2^{1/2}$ years of high school mathematics; if they lacked this background they could go in the evening or try to make up for their deficiency by successfully completing one of our "college-level" courses.

The simplest solution to the remediation problem after Open Admissions would have been to bring the high school approach into the day session and possibly enlarge upon it. This solution was rejected for several reasons. First, it would have meant that a sizable number of our students would have had to delay their college-level work for at least one year. For those students entering in the technology programs, who were counting on going out to work in two years, this approach would have created severe economic and social problems. Second, most of the students with deficiencies in mathematics had already been exposed to this approach and had not learned math with it. Third, we did not honestly think that knowledge of all of the high school material was essential for success in our college courses. In particular, we felt that most of the plane geometry, while valuable, was not necessary for our students.

The Original Program

In designing our original remedial program we decided to concentrate on those students who had chosen career goals in the technical and scientific areas. These students would not have to be sold on the value of mathematics nearly as much as liberal arts students. Besides we felt that we could teach some basic skills in our liberal arts courses to those students who needed them.

This decision left us with the somewhat narrower task of designing a program that would prepare students as thoroughly as necessary and as quickly as possible for the pre-calculus. First, those arithmetic and algebraic topics that were really needed before taking pre-calculus were selected. There would be no extra topics—no frills—in the course. The object was to be able to tell the student, with complete honesty, that he needed to know all the material in the course. This material was trimmed down and packed together in order to fit it into a 1 term, 3 hour per week, course. We knew beforehand that many of the most poorly prepared students would not be able to master all of the material within 1 semester, even though they might think they could do it.

A modular approach, in which individual students could move through the course at roughly their own pace, but under the guidance of teachers and within some structure, seemed ideal for our purposes. So we divided the course material into 4 equal units or modules, with the idea of letting students progress from module to module as fast as they could. Each module was designed so that it contained 8 lessons of learning material, 1 review and 1 exam, for a total of 10 lessons. If a student did not master the material in a particular module, he would repeat that module and only that module before going on to the next.

Before the term started, students were given a placement test to determine if they were ready for the pre-calculus; those that did not pass the test were placed in Module I of the new remedial course. Blocks with at least 4 class sections per block rant at the same time with different teachers in different rooms. Teachers and classes were given a detailed outline indicating what material had to be learned in each module and a uniform course calendar that indicated when the class was to be tested. A high school review book was used as a text. Inside the classroom, teachers, tutors and students were allowed to

develop different approaches to accomplishing their goals. Classes were kept small enough (16 or less students) so that teachers could deal with students as individuals. A personal approach was encouraged in which teachers acted as advisors and even counselors since we knew that many of our students' problems were of nonmathematical origin.

At the end of the first quarter of the term those students who felt they were ready took a mastery test for Module I. Those who passed this test went on to study Module II for the next quarter of the semester, and those who were not ready for the test or who couldn't pass it went back to study the Module I material again. By running a few simultaneous sections and giving tests on the same day, we were able to separate the passing and nonpassing students and place them in different rooms for the second quarter of the term. This was done without upsetting their schedules at all and with a minimum of chaos. (A coordinator is really needed at this point to keep track of all the students, to balance sections and to handle record keeping.)

Physically separately the students in this way gave each group of students the opportunity to study only that module that concerned it. While strict lecturing was, and is, not a widely used technique in this course, this division of students allowed teachers to go over material with the whole class, knowing that it was of interest to almost all of the students in the room. In addition, students in the same room could be grouped, or could group themselves, in order to work together. There was also an important psychological advantage in the separation of the passing and nonpassing students. The students had been repeatedly advised that they were entering the course with vastly different backgrounds and that they shouldn't necessarily expect to keep up with one another. But competition is difficult to overcome, and many of the students who didn't pass the Module I test felt more at ease when they were placed in a classroom with students who were in the same situation as themselves.

At the end of the second quarter, the testing and reshuffling process was repeated. Almost all the Module I students passed the Module I test the second time around and went on to Module II for the next quarter. They were joined by students who had not passed the Module II test and who, therefore, had to repeat Module II. Those who passed Module II went on to Module III. Usually students who pass a module stay with the teacher with whom they have been working successfully, and the other students change teachers. At worst, students must change only their teacher and their room, not their schedule. Students were again tested at the end of the third quarter and placed appropriately for the last part of the semester. Finally, at the end of the term, those who had passed all 4 modules were certified as prepared for precalculus. The students who had not completed the whole course were required to start the next term with whatever module they were up to; they were not required to start at the beginning in Module I again.

We did not, and do not, give the standard A, B, C, D or F grades in the course. At the end of each module a student receives either a P (passing), which indicates that he is ready to go on, or an N (incomplete), which indicates that he must repeat the module. We refer to the N grade as meaning "not yet." When a student has completed all the modules, no matter how long it takes, a grade of P is awarded as a final grade. The real advantage of this type of grading system, is that the role of the teacher as a judge is greatly reduced. Students can ask questions without worrying about their grades and teachers can advise students to repeat modules without worrying about ruining the students' records.

Lessons Learned and Modifications in the Program

Now that I have described in detail the first term of our operation, let me discuss briefly what we have learned from our experiences and how we have modified our system. First, let me state that we have never regarded the program as fixed. We feel this is one of the reasons it has been successful. The teachers and student tutors who have taught the course have met frequently to discuss both their problems and their accomplishments. Student progress through the course and success in later courses, on both an individual and a group basis, have been carefully and repeatedly analyzed, with the intent of improving the program.

Two difficulties with our original course, foreseen and unforeseen, were apparent before the middle of the first term. The predicted problem was the inadequacy of the high school review book as a text. No suitable alternative was found and a team of 4 teachers began preparing new texts[2] for the program. The arrival of these books not only helped tremendously in the regular sections of the course, but also allowed us to supplement our standard modular approach with independent study and Keller plan approaches in the evening and summer sessions, where an insufficient number of students precluded the usual modular approach. The second, unforeseen, difficulty was resentment on the part of some of the better prepared students at having to study basic material on fractions and signed numbers in Module I. The teachers had originally felt that, since these students had already been delayed in starting their pre-calculus for a whole term, it would be better to provide them with a complete term of review. However, the students' feelings were not the same; and it also seemed that some of the weaker students suffered from the mix of students in Module I. To solve this problem, a more precise placement test was drawn up so that students could be placed at the very beginning of the term in whatever module was most appropriate for them. This necessitated the offering of advanced modules at the very beginning of the semester; however, we were already committed to this policy in order to take care of students who hadn't completed the course in the previous semester. Another result for starting students in advanced modules is that some of them will finish the course in less than 1 term, which, in turn, can free teachers for other work, but can also cause an undesirable break in the student's study of mathematics.

The next major change made in the course was an increase in the number of hours per week from 3 to 4. This was done to allow room for a new, fifth, module we felt was needed and also to provide for a second review lesson in most modules. A second review lesson is very desirable in order to relieve some of the "calendar pressure" that comes from predetermined uniform exam dates.

The most recent modifications in the program all

concern the addition of new modules outside of our pre-precalculus sequence. These new modules are taught upon sufficient student demand and as teachers become available in the program. This happens when students who start the course at an advanced level complete it before the end of the semester. One group of new modules comes from the modularization of our pre-calculus for the technology students. Now these students can usually continue their studies without a time break if they so choose. We also have experimented with specialized modules for nursing and business students, and finally, this term, we are adding modules to help prepare liberal arts students for a required basic mathematics proficiency examination.

An Evaluation and the Future of the Modular Approach

On the whole, the modular approach to teaching remedial mathematics has worked well at Staten Island. Our principal objective has always been to provide students with a thorough preparation, as quickly as individually possible, for the pre-calculus course. In this regard, the records have shown that students with weaker backgrounds who go through our remedial program do just as well in pre-calculus as do students with stronger backgrounds who place directly in pre-calculus. The records also reveal that our program has helped students to a similar extent in other mathematics, science and technology courses. We also know that students with deficiencies in mathematics who go into these courses without completing their remedial work do not do well as a group.

It is difficult to predict what changes we will make in our modular approach to teaching mathematics at S.I.C.C. While it is improbable that we will extend this approach to our calculus courses because of insufficient numbers of students, it is conceivable that we will be asked to develop and teach new, specialized modules that already fit into our present sequence of offerings. In the meantime, our immediate goals include computerization of the record keeping, increased utilization of our math center, and improvement of our pre-calculus modules.

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Why Many Students Have Trouble With Mathematics And What Can Be Done About It

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Many students entering our colleges in recent years have serious weaknesses in basic skills for which a number of types of remedial programs have been set up. In preparing students for required mathematics courses, such programs have proved helpful.

For students to be successful, however, in mathematics-related careers, consideration of long-range goals involving student ability to extend at need their knowledge to mathematics is always necessary.

These long-range goals to be effected require adequate attention to inevitable negative factors:

1. Antagonistic student attitudes towards mathematics
2. Unsatisfactory student methods of learning
3. Unsatisfactory student methods of solving problems as applied specifically to mathematics.

This paper discusses negative factors, their effects, and offers suggestions for improvement.

1. Antagonistic Student Attitudes

Many students (perhaps most) dislike and some hate mathematics. Relatively few find the subject rewards or challenges.

Student failures have caused the subject to be disliked and avoided. The dislike is intensified and reinforced since few students perceive any relevance in mathematics to their future work and lives. Consequently, they regard it as a required hurdle to be overcome before graduation. Many students approach mathematics classes with a desperate hope that they may grasp the "rules" for what seem to them meaningless problems. With these "rules" to save them, perhaps they can pass the tests, whether they understand what they're doing or not, and finally escape from math requirements.

2. Student Learning Methods

Almost all students who have trouble with mathematics have the following characteristics:

a. They have poor study habits.
b. They don't know when to take notes, nor how to take them effectively.
c. They don't know how to learn from textbooks or other learning aids.
d. They are very dependent on the teacher; absence from class always means great difficulty in making up the material included in lessons they have missed.
e. They don't know how to prepare for nor how to take tests effectively.

Such deficiencies mean that although possibly we can impart information to students for immediate application, limitations are severe where it concerns solution of different types of problems or acquisition of new material.

3. Methods of Solving Problems

When confronted with a problem, such students search their minds for a "rule"—"What have I been taught that will solve this problem?" They show a minimum of effort to reason. Several examples of their "thinking" follow:

1) $-7 - 2 = +5$, since you have a 7 you're taking 2 away, the result is 5: two minuses make a +: by the "rules" the answer must be 5. (Sometimes, however, the answer is +9.)

2) $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 3/12$. The "rule" is to add, 1 + 1 + 1 = 3, 4 + 4 + 4 = 12, and the/mark indicates a fraction. The answer, by the "rule" must be 3/12.

3) Plot y = 4. Many students have trouble with this even though they are familiar with x + y = 4 because they've seen similar problems. Since they haven't seen one like this, they give up the struggle without applying their reason to the situation.

4) $7 - 2 = +9$. The "rule" is: don't subtract, add the opposite. Rigid application can only mean that 7 - 2 becomes 7 + 2 = 9.

In each case, the student goes wrong because he feels the problem has no relation to a real situation. And, in each case, the student does not think to ask, "What am I required to do, what is the problem?" In the whole process, the student seldom checks his answer: he rarely considers whether it is reasonable. Mathematics, for many students, is neither a pattern of thought, nor such a series of questions as: What is given, what is required, how eliminate factions, how achieve a common denominator, how simplify?

Such reasons may explain why students do well in a lesson and poorly on examinations. The lesson generally employs one method for students to apply. Instructors, too, consciously or unconsciously, give hints indicating the choice of a valid method. Thus, "How do we get the lowest common denominator?" is applicable in the context of a lesson but on a test, students must choose one of several methods; since they rely heavily on memory, a problem different in appearance from what students remember often results in immediate panic or a wild guess. Analogously, students may do reasonably well in a module or a course but, a short time later, the same material has been forgotten.

1. These students never really learned (reasoned through) the material. They memorized rules and methods which, when they no longer practiced them, were forgotten.
2. More mathematics "learned" means more methods to remember, thus a wider choice of "rules." This all amounts to diminishing chances of a choice remembered correctly.

At the outset, several suggestions should be stressed for overcoming factors causing students difficulty.

1. Problem choices should be more relevant. Such problems as, what is -2 -7? what is $\frac{1}{4} + 1/5$? what is a^2b^3 times a^5 seem to show that the answer, not its relevance, is what is important. Again, problems should be related to every day life, to finances, to science, to technology, to business. Mathematics can be applied often to environmental issues: in fact, several publications with such collections of problems have appeared recently.
2. Posters and displays are admirable to show applications of mathematics to fields like nursing, technologies, and business. Teachers from these fields are prepared to give adequate aid in choice and preparation of subject matter. The campus itself offers admirable opportunities to indicate the relevance of mathematics and its applications. Math clubs, puzzle contests, films, and guest speakers are good possible developments.

3. There should be a variety of problems and students should learn the many facets to mathematics and its many challenges. Briefly, (there is a considerable modern literature), problems can involve induction, guessing, discovery, use of the subconscious mind on problems where answers aren't given immediately, recreational mathematics (puzzles and games). Students often appreciate mathematical concepts not abstractly, but through such problem-types as well as problems related to their own lives.

4. Problem solutions involve more than a bare answer. Students should (1) show they understand the question, perhaps by stating it in other terms or by converting it to a word problem from a given symbolic form, (2) show the reason for every step, (3) show a check for the problem, preferably by approaching the problem from another point of view, (4) give another application or statement of a similar problem, (5) answer such questions as, "What if the 2 were changed to a 3 or to -2?" "What if the + sign were changed to a - sign?" Performance of such problems leads the student to understand the material in its significant aspects. Hence it will not be forgotten easily. Such an approach should reduce the prevalent student habit of reliance on half-remembered, irrationally applied, and often inapplicable "rules."

5. Students should question every step in every mathematical problem. Everything has its reason that justifies it: accepting and acting upon what the student has tested by reason is the best possible, and the only, way to break the bars that hold him prisoner. Perhaps Kipling's poem is the ultimate guide:

"I keep six honest serving men.
They taught me all I knew
Their names are what and why and when
and where and how and who."

6. Textbooks and other learning aids should incorporate examples responding to such questions as:

What is the problem? Can you restate it in your own words?

What is your justification for this step? Can you check your answer?

Can you obtain the result in another way?

Can you construct a similar problem and solve it?

Can you apply the results to other situations?

If some of the given data were changed, could you still solve the problem?

The book should guide the student to answering these types of questions.

In short, students should be taught to look on mathematics as a series of questions for them to pose and, by their solution, to answer. Unless they can do this, they should be dissatisfied even if they can apply a rule and get an answer.

7. Students must be taught how textbooks are to be used. Inevitably, without this, class absence results in absentees' lagging behind the class. Since failure to understand the use of the textbook results in over-dependence on the teacher, there will be student failure to learn independently and a subsequent limitation in many future careers. Instructors, on occasion, should "read" the textbook with students, showing how to question understanding, how to check every step in a solution, how to translate from "textbookese" to their own language. Sometimes problems should be set without previous instructions: they must use the text to find out how to solve its problems.

8. Students should learn that the taking of notes is but a first step, since notes alone are soon worse than useless. They provide misinformation resulting from uncorrected errors and missing steps. Students should leave space in their notes to fill in gaps, to give reasons for every step and for every number, to construct problems similar to the example given for solution, and to write down questions on points to be raised at the next class session.

Failure to do this is probably why the lecture method has been found to be so largely ineffective with most students. Passive in class, following the teacher, students take notes on everything whether or not they understand the lesson. Since they don't review notes properly until too late, when the material of the lesson has faded from their memories, half-understood rules are all that remain.

9. Checking should be strongly stressed and no problem should be considered complete until checked. Students should form the habit of asking such questions after every problem as,

Does this answer seem reasonable?
Can I solve this problem another way?
Is the answer in its simplest form?

For problems in letters,

Are dimensions consistent (all inches, say)?

What happens for limiting cases?

10. Students should be taught how to study, how to learn individually, how to prepare for and to take tests, how to use texts, how to take notes, how to make them meaningful. Instructors may prepare students to pass a test and even a course, but without these skills, the material taught and learned in large part has been forgotten. In later life the student has no methodology by which he may keep abreast of his field or advance in it.

11. Students should be shown frequently that math is intelligible and related to the world in which we live. The inductive method for answers for difficult cases follows a pattern that results of simpler cases establish. Again, rules and their relations can be shown by solving realistic problems. Thus, why **don't** we say ½ + ¼ = 2/6? (Apply such an example to half-dollar, a quarter.)

12. Students should be taught how to find out for themselves the correctness of a mathematical step or method. Failure to do so usually means later that they've forgotten and abandon the problem or make a guess rather than apply reason correctly. For example, in (a + b)/a, can the a be cancelled? The student can substitute values for a and b, work the problem by cancelling, without cancelling, and compare the results. Or, what is the sum of 2/3 and 5/7? A simple case, such as ½ + ¼, where the answer is known, recalls the pattern for application to the more difficult case. Proceeding from a simpler case to establish the truth of a more difficult case is a most valuable procedure and should be stressed.

Our remedial programs are having a short term success in preparing students for immediate goals. But, unless we improve student motivation, learning methodology and approaches to problem solving, we shall not have long term success in mathematics education that involves confidence in new situations, and successful application of new mathematics to new circumstances. It is to this

aspect of our current teaching of mathematics that this paper is directed. Its suggestions are simple to understand and apply. They have proved to be valuable additions to mathematics motivation at Staten Island Community College.

The Multi-Media Tutorial Program in Biology

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With the arrival on campus of SEEK students in 1967 and of Open Admissions in 1970, biology instruction had to respond to a far more diverse student body in terms of pre-college preparation and motivation.

The Department tried tutoring, course attenuation and saturation instruction, but none of these was considered successful. It was felt that, theoretically, at least, the best approach would be to let each student proceed at his or her own pace, and then do everything possible to increase motivation. Such a system of individualized instruction has been developed at Purdue University by Dr. Samuel Postlethwait, for biology.

This audio-tutorial method has proven successful in the sciences and social sciences. However, it had not been tried on as diverse a student group as we now have, nor were the printed materials appropriate for our biology course and students. With the aid of a two-year, $110,000 grant from the General Electric Foundation, we proceeded to prepare our own course modules, and to acquire the "necessary" equipment.

Development of materials was left in the hands of a team consisting of:

a) content specialists (faculty) who specified the performance objectives and the consequent subject matter of each module.

b) multi-media specialist/writer who wrote everything required by the content specialists, suggested and researched alternative materials (film loops, slides, etc.), and interfaced between content specialists and graphic designer.

c) graphic designer who prepared poster, designs, copy, at the request of the content specialists, and subject to their approval.

This technique proved extremely effective and efficient, since between October 1, 1971 and January, 1972 more than eight of the thirteen modules were developed and produced. A secretary developed the check-in/-out procedures, and in February, 1972 the first class arrived. The equipment available included 18 carrels, each with a built-in cassette recorder, four film loop projectors, four slide projectors and a minimal television record/playback system. The cassette recorders and carrels were very expensive. We have since proven to our satisfaction that a viable alternative strategy, which might well be superior and less expensive, would be to install masonite partitions on pre-existing laboratory tables and provide inexpensive ($20) tape playback units.

As motivational aids, students were allowed access to the laboratory at any time from 9 A.M. to 5 P.M., Monday through Friday, and were placed in a mastery learning situation. Thus, students were required to pass unit (module) examinations with a grade of 72% or better. If there were unsuccessful in achieving this minimum, they had to retake the test. To discourage indiscriminate test-taking, unsuccessful students could retake only after special oral quizzes. Lecture examinations with a grade less than 72% also had to be retaken, but this could only be done once.

Final course grades were based upon a point system which added Group Laboratory Examinations (GLE), which were based upon groups of units and a practicum, a Voluntary Examination and Performance Instruction to the lecture examinations already mentioned. A student was guaranteed a "C" if: all unit quizzes and lecture examinations were completed with a 72% or better, and all group laboratory examinations were taken (no grade minimum, here). Points were assigned depending upon lecture average, GLE average, voluntary examination average and time, it any, spent on performance instruction. (Performance instruction is tutoring by students in the class of other students who are behind them in the work.)

We were committed to an adequate test of what we now call the Multi-Media Tutorial Program in Biology (MMTP), and so we registered a random, 150-student sample of the 500 or so Biology 3 students. Our students tested out in every way as being similar to the students taking Biology 3 in the standard format, except that the sample of SEEK students being so small, they were advised to register in MMTP. Both MMTP and Standard Program (SP) students were required to learn the same amount of material. In both groups the lectures were separate from the laboratory. The MMTP students received a study guide, tapescript and audiotape in addition to the standard laboratory materials. SP and MMTP students had three lecture examinations (at least one of which was in common) and group laboratory examinations (all of which were in common).

The results were startling: when judged on the basis of final course grades, SEEK, Open Enrollment and Regular Enrollment students did better in the MMTP than SP. This improvement was most impressive for SEEK students. In seven years no SEEK student had ever gotten better than a "C" in Biology 3, and between none and 15% would get even that grade each semester. In MMTP, some 15% to 18% of the SEEK students get "A" or "B" and between 23% and 35% earn "C".

Attrition statistics are illuminating. If we focus on all students earning less than a "D" as being "unsuccessful," then SEEK student attrition decreased from 95% to 51%, Open Enrollment went from 73% to 64%, and Regular Enrollment form 33% to 17%.

The simplest explanation for this improved performance could be that we simply graded too leniently. Giving away A's and B's can certainly improve a class' apparent performance. To see if this was the case we compared the average grade of SP with MMTP students on the group laboratory examinations. MMTP students did, on the average, 15% better on these same tests given to both groups. From this result we can conclude that our students learned more than did the students in the traditional laboratory.

It would be comforting to be able to ascribe this increase to the effectiveness of our methods and/or materials, and to some extent this must be partly true, but we believe the major factor has been the amount of time spent by the student in the multi-media laboratory. Standard Program students could never spend more than three hours each week in the laboratory. One of our stu-

dents spent 21 hours on a single week's work. Generally speaking, the higher the student's grade, the more time he or she spent in the laboratory. Students who dropped, averaged 2.4 hours/week in the laboratory while those earning "A" averaged 7.4 (SEEK) or 3.8 (Regular Enrollment) hours/week.

In short, students put in more time aided by special materials, and with a laboratory instructor always present, and they earned higher grades. Students liked this approach (83%) and would like to see other courses use this method (69%). Over two-thirds of the students felt that the laboratory was pleasant.

The sole negative aspect seems to be that MMTP students have not increased their grades in advanced biology courses, which some SP students will achieve; but, at the same time, 21% of students in either group fail or drop their next biology course. It seems at least possible that the MMTP students have realized their best grade, and that once thrown back into the traditional classroom, they are only slightly better off than before.

What might other campuses do? The biologists could, if they wish, adopt the materials and buy the cheapest hardware, and be operational very inexpensively. Other science and social science departments could prepare materials themselves. Anyone interested in going further should contact the writer since some help might be available.

The important points to keep in mind are:

1. The method works.
2. Students like the method and become highly motivated.
3. Creating a multi-media tutorial program is neither as costly nor as complex as it sounds.

We are currently adding a computer capability to the MMTP for problem solving, game simulating, testing and student reporting/recording.

Cooperation Between Biology Department and Basic Educational Skills Department

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The biology department at Queensborough introduced a new course in the Fall semester, 1972. This course, "Microbes and Man," was an experiment in correlating basic education skills reading with the biology course content. In it students learn biology, earn credits, and improve reading skills. Most students enrolled are in a liberal arts and non-science curriculum--several may elect careers in nursing or medical laboratory technology. Approximately half the students are freshmen whose science fulfills graduation requirements.

This is a four credit course in one semester, and comprises three lecture hours, two laboratory hours and one discussion period. Its subject is practical aspects of microbiology and is neither a "watered-down" version of a general microbiology course for biology majors, nor a training ground in technical aspects customarily associated with microbiology. Rather, the course involves very practical knowledge touching on students' everyday life, designed for those with little or no scientific background. Basic biological principles are introduced: micro-organisms are the central foci rather than the more conventional multicellular structures usually presented in general biology.

Micro-organisms are well adapted for such a course since as examples they explain such aspects of biology as metabolism, genetics, and ecology. Microbes, in their contribution to life on Earth, play a vital role in the well-being of man. Specific topics are:

1. Historical perspectives—the influence of infectious diseases on human progress.
2. Importance of micro-organisms in today's society.
3. Nature of microbes—a brief non-technical survey of micro-organisms.
4. Basic biological concepts: microbes as examples.
5. Immunobiology—non-technical aspects of humanity's immune responses, use of vaccines, immune sera and impact of mass immunization programs.
6. Epidemiology and public health—transmission patterns of infectious diseases and methods of control.
7. Ecology—host-parasite relationships: role of microbes in current ecological problems (water, air, animals, insects).
8. Heredity, evolution and society—microbiological implications for man from genetic, social, religious, legal, moral, and ethical points of view.
9. Role of microbes in current human problems such as solid waste disposal, water pollution, sewage control, foods, economy.

In the laboratory sessions students learn to:

1. Use a microscope.
2. Make and stain slides.
3. Cultivate microbes under a variety of conditions.
4. Study enzymic activity and metabolism, and make such products as yogurt and wine.
5. Control chemical and physical methods of microbial growth.
6. Understand disease transmission and control procedures.

The discussion period is devoted to current magazine or newspaper articles involving some aspect of microbiology. At each session the student designated presents an article orally and leads the discussion. The purpose is two-fold—to involve students in the reading of current scientific articles and in learning of pertinent vocabulary and suficient background information to ensure intelligent presentation. Students also are required to read a book other than the class texts and to hand in a written report upon their reading.

The course has been presented twice. Comparison of grade results with those of previous biology courses shows little difference between prior exposure to the reading course or the reading and biology courses when taken at the same time. Thus far, none who took both courses coincidentally have failed. Students taking both courses at the same time have enjoyed the extensive private student tutoring supplied by the college. An excellent student tutor may prevent failure.

The project has been reasonably successful and merits continuation. It should add, however, such improvements as an open lab for students to review lab material, audio-visual tutorial material, and self-paced modules.

Reading in the Content Areas: Natural Sciences

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Definition of Problems

We find at Queensborough Community College that students who need remedial reading and study skills have a number of basic academic weaknesses.

1. Inability to understand the technical and general vocabularies of science texts.
2. Difficulties in understanding major ideas and related details of science texts.
3. Junior or low Senior high school reading levels.
4. Lack of preparation—the text usually unread before the lecture.
5. An attempt to copy the lecture verbatim, or
6. No notetaking.
7. Rate of work extremely slow.

Description and Organization of Reading and Study Skills Course

The course described is a BE 03 class, "College Reading and Study Skills," in conjunction with a section of Biology 180, "Microbes and Man." The texts for the reading course are the two microbiology textbooks of the Biology course.

Microorganisms and Man by Wyss and Eklund and **Our Precarious Habitat** by Bernarde are utilized to teach reading and study skills but not to reteach microbiology. Other materials—teacher made dittos, exercises from reading textbooks, an overhead projector are integral to the course.

Students meet in the reading class twice per week in sessions of approximately 1 hour 20 minutes each. Twice per week for one-half hour, students also attend a reading lab. Students work independently in the lab with tapes, pacers, and content area materials.

Skills taught are:

1. Study techniques for reading a text.
2. Chief ideas and details.
3. How to take notes (text and lecture), outlining, underlining, summarizing.
4. Patterns of organization—time order, simple listing, comparison-contrast, cause-effect.
4. Comprehension skills—literal, inferential, critical.
6. How to write objective and essay tests.
7. Vocabulary—technical and general, prefixes, roots, clues to context, dictionary skills.

A Program of Inservice Education for CUNY Faculty

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Recommendations from the 1971 Carnegie Commission on Higher Education, the 1970 President's Task Force on Higher Education, and the Right to Read have established a clearly recognizable Open Admissions policy national in scope. It commits education to equality of opportunity, to increased educational mobility through integrated systems and college level ancillary programs involving preparation for students educationally underprepared.

Implementation of such programs makes new burdens for the instructional faculty. In the past faculty members primarily worked to achieve student skills of basic competence, but today, faculty who teach primarily content curricula are most significant in their response to this change of emphasis.

New and experienced teachers alike seek guides to the needs of the new Open Admissions student population. Profiles of community college faculties in general reveal that the instructional staff has brought to college work past experience in business and industry, post graduate degree or degrees in their area of specialization, current experience on the job (often they still function as consultants in their field).

Of course, instructors should be able to communicate not only with their professional peers, but with students. Effective teaching requires both "people awareness" and "content orientation." Learning is a complex process so, in attempts to impart information, teachers must be concerned with the student as he is. Educational experiences with Open Admissions students should develop sensitivity in a college teacher to the best learning modalities of the current student population as well as explore alternate modes and strategies to impart relevant material. Most college faculties could benefit from additional training in methods of teaching, educational psychology, curriculum planning, learning theory, group dynamics, and techniques of remediation.

Current content faculty reevaluation of "trusted teaching methods" in terms of the Open Admissions population calls for a program of inservice training to include workshops that develop innovative, appropriate course supports. This includes, of course, practical applications for classroom use.

One workshop, for example, should focus on **instructional objectives** that will include development of a workable document for faculty and students in which there should be identification and definition of appropriate instructional objectives after the development of a course sequence of curriculum units and single concept components. Instructors must define content by micro-teaching concepts and method by selection for evaluation of the most relevant materials, procedures and criteria. Effective communication between instructor and student requires at once explanation of educational objectives, student responses in terms of achievement of realistic and attainable goals, results that ensure a successful completion of the course.

Rather than as a subject that is taught three times per week, reading should be regarded as a tool for all learning situations. Workshop sessions, therefore, should deal with organizational reading and study techniques as communicated to the students and as they relate to a specific subject. **Textbook notemaking** and **lecture notetaking** are organizational skills whereby the faculty guides a student to master a required curriculum and to integrate new knowledge with past experience. PORST or OK4R or the similar SQ3R are **study techniques,** mnemonics, utilized to develop such skills as previewing, formulation of questions, establishment of reading purpose, summarization of key concepts and review of newly acquired information from classroom lectures and outside readings. **Textbook notemaking** is a skill requiring emphasis to secure student selection of relevant concepts, supportive detail, vocabulary, and formulae. Instruction often may be attractive as set forth in "How to Read" charts, graphs and diagrams. During the lecture, the student needs to put essential information in his notes and to include important details relevant to its concepts. Notetaking is a complex skill involving listening, integration of information, and a style of writing both organized and concise. Our students often cannot integrate these multiple processes.

In context of every curriculum specific terms common to the profession are a new language for the student. Development of **content vocabulary** requires manuals of essential vocabulary, definitions, transliterated pronunciations and usage in context. Well chosen tapes to accompany such manuals aid a student to develop verbal and auditory acuity without the interference of others. **Media in education** requires additional sessions. The teacher, as listener and teacher, at once must evaluate such experiences to enhance the concepts taught. As media, or as decision-maker and selector in choice and use of instructional materials, the teacher selects appropriate methods, media experiences, materials and equipment to appeal to students in their interests, backgrounds and capabilities in such a manner as to permit them to function effectively and efficiently. Workshop sessions are best for actual design, preparation and production of appropriate media for classroom use and for independent self-paced study.

Supportive media aids: A media team should work with faculty in designing and developing supportive instructional aids for classroom use, tutorial sessions and student reference. A request from a faculty member, a tutor or the student with whom work is scheduled, could initiate a media project with that request to be referred to the department chairman both from pre-production planning and for final approval. New and appropriate visual aids and sequential instructional modules to support course content, as well as the editing of existing media, can respond appropriately to changes in content curricula. A cross-reference index coordinates intra-departmental efforts, library resources, new and available media.

Teachers continually must choose new textbooks. These should be in a session for the use of well correlated formulae to determine readability levels of written materials. **Cloze procedures** can indicate students' level

of ability for work with existing and proposed textbooks and are valuable teaching tools. A session should be devoted to a critical analysis of faculty criteria of **evaluation of student performance** and should deal with test construction to ensure content and sample validity. A test should include important knowledge and information actually taught and reflect the emphasis the teacher placed upon them. Time devoted to a topic in class should have its proportional weight in evaluation of student performance. Discussion of techniques help to determine whether questions actually differentiate levels of ability.

Sessions should be reserved for discussion of **special services available within the institution** such as financial aid, health and drug programs, tutorial assistance, remedial programs, and counselling.

Again, students require assistance to develop necessary skills, attitudes and knowledge to achieve the independence necessary for any evaluation of choices in education and career. Many students, however, have difficulty in developing competence since weak academic backgrounds, unflattering self-images, or other difficulties hinder them in their use of the college's educational occupational programs. Colleges strive to frame effective developmental programs of internal personnel integration with the content teacher its interlocking pin. A final workshop session should collate and integrate all materials prepared during the preceding sessions.

A source book as prepared by each participant for his specific content course, could be made available for other departmental faculty members who teach that course. Thereby quite informally, the content of the workshops, the source book as experience shows it, becomes motivation for continued inservice education. Workshop leaders on individual and seminar bases who visit other workshops also aid in successful implementation and utilization of inservice techniques.

Viable **alternate formats for faculty learning sessions** may focus on a discipline as a logical organizational format with three hours of released time allotted to 20 to 30 faculty members. Resource units may include faculty participants who teach, counsel, or administer a department in common, with possibly ten two hour seminars to be scheduled. Follow-up visits, observations and conferences throughout the academic year, adequately implement such an inservice program. Another format is a program whose seminar participants with the college represent several departments: again with three hour released time throughout the academic year for its follow-up classroom observations and conferences for continuity. A summer institute is flexible with scheduling of 12 to 15 sessions, and makes possible attendance from a wide geographic area. In its full-day sessions participants can complete projected work involving in-depth materials that result in sources for content. Provisions for assistance and evaluation by participants of inservice techniques and materials are an integral component. Travel incident to such a seminar is a factor that must always be considered.

Inservice training aids content area teachers in becoming cognizant of the wide range of learning strategies available for course curricula as it helps students to conceptualize and to integrate their newly acquired information.

The Function of Tutoring Assistance in A College Reading Program

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Increasing attention is being directed to tutorial programs.

There seems to be growing sentiment that even remedial classes of 15 or less, recently established by the Board of Higher Education, may not be adequate for instructors to reach students with maximum effectiveness. Even so, students who receive remedial instruction in the classroom can achieve significant, sometimes even dramatic gains when supplementary tutorial assistance is available to them.

There are, of course, inherent limitations even to individual tutoring. I am certain most tutors admit they do not possess the professional background and expertise of faculty members. Students being tutored probably would agree. Tutors and their students will agree too, that even an effective tutor cannot duplicate the excitement and electricity of a stimulating classroom atmosphere. Nevertheless, tutoring can help students in many ways.

The tutor in a college reading program is, like the college reading teacher, in a peculiar situation for he has no convenient subject-matter "hook" of teaching or tutoring expertise. I'm sure we have all heard it said that every subject matter teacher is supposed to be a reading teacher as well. In reality, however, many subject matter teachers do not teach systematically those reading and study skills students need.

This matter may be considered from a different point of view. If subject matter teachers are not always sufficiently aware of students' reading difficulties, we as reading teachers (and the reading tutors as well who work under our supervision) should become more familiar with specific subject matter areas. At Queensborough in our reading program we try to use tutors who have established their own competence in a number of college level courses.

I'm sure every college in the City University utilizing tutorial assistants has its own unique approach. At Queensborough, for example, every department in the college is allocated a budget for tutorial assistants. We have a Basic Skills Department (of which I am a member) essentially concerned with remediation in reading, writing, and study skills. Our department is allocated two sets of tutorial assistants— one group to deal with students' writing problems and the other group, which I supervise, with reading and study skills problems. We recognize, of course, that many of our remedial students need help to improve both their reading and their writing skills.

At Queensborough, the students receive tutorial assistance in reading on a voluntary and, on the whole, satisfactory, basis. One advantage is that students with whom we work have shown their motivation. No one has forced them to attend since our instructors can only suggest or urge students to apply for tutoring assistance. Again, the voluntary character of their arrangement permits us, in a somewhat informal way, to evaluate the effectiveness of our tutoring program. We assume the student who voluntarily reports for more than one tutoring session feels that the tutorial program is helpful. Last semester, for example, over 100 students appeared for their initial tutoring appointments and more than 75 percent of them voluntarily made follow-up tutoring appointments.

In addition, towards the end of each semester we ask each tutorial student to fill out a brief and anonymous questionnaire evaluating the tutorial experience. We were gratified but not too surprised that a large majority of our students felt they were being helped by the tutors. We had hypothesized that since students were reporting voluntarily the questionnaire was also useful, of course, in helping us to identify specific areas in which students felt they were being helped.

Our tutors consider our evening students are often well motivated since a night student works all day at a full-time job, attends evening classes, and still finds time and energy for voluntary attendance at tutoring sessions. I strongly urge, therefore, in implementation of a tutoring program, favorable consideration of the evening student, who is very often mature, serious, and highly motivated.

Interestingly enough, in some cases our tutors have found that a student's basic problem cannot be helped by tutorial assistance. A tutor recently reported, for example, that one of her students was not responding to the tutorial work. Instead of concentrating on the tutor's questions about the subject matter, the student, also a woman, continually interrupted the tutor with questions as to preferred styles of clothing, of music, and other matters dealing with the tutor's personal life. Occasionally a tutor reports that a student is very depressed, perhaps hostile, and not responding favorably to the tutoring process. We should keep this in perspective; such incidents are infrequent. In the event of difficulty, I ask the tutors to schedule an appointment for the student with me so I can determine what type of action to take in each instance.

Fortunately, most students who report to us do not come with non-remedial problems. A more typical case for us involves a student whose problem lies in a specific reading or study skills area. Whenever possible, our tutors instruct their students in these skills by using subject matter textbooks and materials. Isolated exercises from reading workbooks can be beneficial when working with students, but I question the permanent value to students of this type of learning.

We could deal here with administrative aspects of tutorial programs, scheduling problems, absenteeism, hiring of tutors, physical locations for tutoring, in-service training of tutors, budgeting problems.

Still, since this session is a workshop, your specific questions and interests should determine the particular areas we touch upon this morning. I hope you feel free to raise questions and share with us any of your experiences with tutoring programs.

I certainly don't expect all of our questions and problems as to tutoring will be solved here today. I do hope, however, that by the end of our session you will have gained new insights and perception concerning tutorial assistance in college reading programs.

Approaches to Instruction in Reading Improvement: Co-Teaching

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In the workshop "Approaches to Instruction in Reading Improvement: Co-Teaching," Prof. Richard Gerber (Associate Professor of History) and Mrs. Phyllis Cash (Lecturer in Academic Skills) described an experimental approach to teaching underway at Lehman College. The experiment consisted of yoking together in one co-requisite combination the teaching of introductory American history with the teaching of basic reading and study skills, without loss of academic integrity or the intellectual objectives of either discipline. The experiment represents one attempt to respond to the needs of Open Admissions students who enter college-level history courses with insufficient preparation or with skill deficiencies in reading, studying and writing.

Before any innovative design could be prepared and implemented, the faculty members involved evaluated the conflicting pressures placed upon them and that they would place upon each other as partners in the co-teaching endeavor. For historians the demands of research and writing, coupled with the mass of historical information and the historian's professional training, work toward an increase in complexity, specialization and a narrowing focus in content analysis. It is impossible to remain a generalist aware of the basic patterns of historical thought over the sweep of history. On the other hand, increasing awareness of the problems our students face, together with the need for innovative pedagogy (especially at the introductory level), result in pressures to simplify, to omit material, to make easy generalizations, and to lower academic standards.

For people in Academic Skills there are perhaps even more frustrating conflicts—conflicts between social philosophy and professional standards they have not set; between the needs and expectations of individual students, and the claims of bureaucracies that restrain structural change. They face directly the results of prejudice, academic self-righteousness and pedagogical incompetence.

The burden of teaching history to students with an enormous range of experience and skills was increased by the complexity of making the attempt within the framework of a large lecture class. Introductory American History at Lehman (because of student demand and staffing) is taught traditionally in sections of approximately 200 students. Conventional techniques of lecture classes stress the survey approach—that is, students normally are responsible for acquiring a reservoir of factual information for analysis, challenge, evaluation and testing. Essentially a purely content-oriented method, the lecture system presumes sophisticated thinking, independence of mind, and an already existent capability to read and write critically and effectively. In such a structure Academic Skills faculty were used as remedial resources only; when a student had academic difficulty, there was an occasional reference to someone in Academic Skills for assistance in reading or in preparing written work. Our goal, by contrast, was to create some way to satisfy the requirements of an academic introduction to American history, and at the same time to involve Academic Skills expertise as an integral part of the course.

Several major revisions of the course were undertaken in order to provide, within the limits of administrative support and scepticism, individual attention for students that was impossible in the lecture system. Instead of three weekly lectures, students were divided at random into four sections of forty, supervised by graduate students working on their dissertations in history, and with some background in the teaching of reading or equivalent experience. Adjunct Lecturers, they are budding historians with knowledge of the subject matter and enthusiasm for working with Open Admissions students. These staff people provided most of the teaching in the course, meeting their students in sections for class discussion covering the assignments, tutoring individuals in office consultations, evaluating written reports, and serving almost literally as confessor, judge, policeman, parent and friend. In weekly meetings, Professor Cash guides the Adjuncts in problems of student expectations and skill development, as does Professor Gerber in problems of the historical material. Both faculty members visit sections regularly to observe and to participate actively in the teaching process.

The major co-teaching aspect of the experiment was set up by establishment of a reading study skills section to run parallel to the history course taught by Professor Gerber. Students registered for both History 105 - X and ACS 110 - Y, in a procedure like that for regular ACS or History courses. Thus, the experimental sections dealt with the same student population as their nonexperimental counterparts. Once registered, students predicted as most likely to need aid in history (based on high school indices, ACT social studies and English scores, high school grades in social studies, placement exams and personal interviews) were assigned to Mrs. Cash's section for compensatory instruction.

While the objectives of the ACS course remained integral, materials employed for instruction were, for the most part, those of the history course. Basic skills, such as outlining, paraphrasing and summarizing utilized the documents and books of the history course as illustrative and practical models. Vocabulary development, textbook analysis, and literal and interpretive comprehension skills had a similar focus on this same body of materials. The process of transfer of learning was intrinsic to the design of both courses. For example, in teaching the skills for taking notes from lecture (ACS students attended the lectures as members of the history course), the lecture was recorded, and the class developed a model set of notes from it. ACS students have made excellent progress in their notetaking skills: they now require half the time usually needed to achieve the same level of efficiency. Improved skills were reflected in improvements in fulfilling the history assignments.

Some skill units, such as the writing of a research paper, used materials and assignments from the history

course and also supplementary resources reflecting other areas of student interest. Other skill units required material entirely external to the history course, such as the unit dealing with taking examinations, since the history course did not use the essay or short answer examination for evaluating student learning.

Structural revisions in the history course were matched by jointly developed content revisions. Working together, the staff agreed first to emancipate ourselves from the necessity of "covering" every aspect of American history from 1607 to 1865, in favor of a problem-solving method preserving the academic nature of the course. The decision was made to emphasize two major historical problems; the causes of the American Revolution, with special reference to the Stamp Act crisis of 1765 and its aftermath; and the background of the American Civil War, concentrating upon the major issues of the 1850's. The study in depth of these two areas allowed investigation through the use of primary materials, as it permitted comparative evaluations.

We introduced the "process" approach to the study of history in a course introducing students at the earliest level of study to specific problems historians encounter in reading and writing history. They involved precisely those skills in reading, studying and interpretation most needed by our students. Our focus was upon the historian's methodological and interpretive equipment, and not the authority of his conclusions alone. We were particularly concerned that students learn to isolate and explain what historians call "theses," the interpretive generalizations framed as hypotheses or arguments. Similarly, students had to become familiar with the use of evidence, the combination of data and reasoning that either validate a thesis or fail to validate it. We wished students to be able to identify bias or subjectivity in what they read, or in themselves, and to evaluate to what extent bias distorted the evidence. Ultimately, students write narrative accounts of a historical event, based upon documents presented to them, with, of course, themselves employing a thesis, appropriate evidence, and a narrative style.

In order to provide challenge and to satisfy the historical dimension of the course we worked up a range of historical materials presented in an ascending order of sophistication, from single documents, to articles by historians, to monographs and scholarly reviews. At all points students were required to analyze the material in an escalating series of written assignments, culminating in narratives. Eight short papers were included as formal assignments; we accordingly scrapped examinations in class and cancelled the final examination. We made the assumption (perhaps the pious hope) that students taking the history course to fulfill college requirements would find a basic methodology transferable to social sciences or humanities. For prospective majors the methodological grounding (something students at the major level are expected to acquire by osmosis) should be applicable to advanced historical study. In any event we thought the "process" as valuable as any information students were likely to remember from the conventional survey course. Most important, we attacked problems of skill acquisition and intellectual inquiry as concurrent and complementary. Conquest of the first enhances the other.

At this writing no definite conclusions can be drawn with certainty, since the experiment is still in progress. There are, however, several specific questions that must be asked. Is teaching/learning of reading and study skills more successful in relationship to a content-area course? Is teaching/learning in a content-area course more successful when reading and study skills related to it are presented simultaneously with it? What specific effect will the modified structure have on student performance? Will student attrition rates be different in this experiment than those of the usual courses? Will student performance be better in a "proces-oriented" course than in the traditional survey? Will ACS students in the experiment receive higher grades in history than students in regular sections of history? How will nonexperimental ACS sections function? What result can be anticipated from students not taking any ACS course? Will Nelson-Denny post-tests scores show greater improvement for the experimental group as compared to regular groups? Will experimental students carry over their training to other courses?

We can suggest, based on professional evaluation, at least a few tentative conclusions. (1) Students in ACS-Y showed superior performance in the history course than would have been predicted by their high school averages, ACT or Nelson-Denny pre-tests. (2) Student motivation in the ACS-Y section was exceptionally high. Attendance has been high and the dropout rate very low. (3) ACS-Y students found the "process" approach to history exciting, and perceived themselves as having grown markedly in comprehension. It may be hoped, of course, that thorough analysis of the results of the experiment will encourage continuation of the experiment. The impact of the experiment upon the future of relating content areas and Academic Skills remains an open, a provocative and a challenging query.

In-Service Training for Faculty in Reading Improvement Divisions and Social Sciences

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Professor Aaronson: Our meeting of reading and content area instructors testifies to a recognition of mutual need. Five years ago we were all in our special places and reading was off to one corner, like an illegitimate cousin no one wanted to recognize. Now we reading teachers are glowing as we realize we are needed by the academic community.

The reason there has been such a dramatic change in attitude is because of CUNY's new admission policies. We're seeing more of what has been described as the "new student" by K. Patricia Cross in her book, **Beyond the Open Door.** According to Cross, this student's profile, which many of us certainly can recognize, is that of one who avoids work, reads little, seems passive and incurious, needs a great deal of structure and reinforcement and seems to lack communication skills. Students who fit this image are the "T.V. babies."

Our purpose today is to provide a forum for an interchange of ideas and to explore models and experiences at different institutions that have attempted to bring skill and content areas closer. Perhaps we can take a moment to describe the programs at Queensborough which reflect the new spirit of accommodation between reading and history. Steven Cole, a member of the history department, and I have been cooperating since 1970. We started by devising an informal reading test in history in order to identify when tutorial help would be most effective.

Professor Cole: Our informal test was a self-contained, often rather dry piece of writing followed by a series of questions ranging from the simple location of a fact to complex understanding of concepts and interpretations. We found the test was eighty percent effective in predicting student inadequacy. From the second or third week of the term, therefore, sometimes before experiencing real difficulty, students come for tutorial work. Our tutorial program is voluntary. We use students from the four year schools as tutors. Tutors meet with students weekly or bi-weekly. Faculty also meet with tutors to discuss academic problems.

The tutorial program has been enormously supportive. The failure rate among students who do not come for tutorial assistance is three to four times higher than among those who do. Those tutored improve significantly. I think there are three reasons for the success of this program. First, we are using young tutors who do not present an authority image; second, there is one-to-one contact between student and tutor; and third, the emphasis is on strengthening skills while using historical material. This is not a crash program for tests.

We never established a control group. This is a voluntary program and that in itself has elements of a control. We decided not to make it compulsory—I do know it's working, but I wouldn't say just where it stands exactly without further testing.

We use the seminar method to train tutors. Because of the size of the reading component in history, tutors have to be trained not only in teaching historical concepts, but in helping students learn effective study skills and methods of handling texts. The seminar method is extremely effective as a training technique since it allows tutors to discuss current problems as they occur and to gain insight by discussion with other tutors and supervisors. What we have now is a closely coordinated program. Our next step should be to make this an instructional program.

Professor Aaronson: In addition to the tutorial program, this term another example of interdepartmental cooperation is our co-teaching experiment in history and reading skills. I was given permission to set up an experimental class in reading skills in history. It was comprised of that small but significant group of students who barely failed to pass the placement test but who, nonetheless, demonstrated valid indicators of probable good performance on the placement test, such as percentile ranking in high school, passing grades in social studies and English, and fairly high vocabulary scores. The course in reading skills was planned in correlation with the course in ancient history, taught by Dr. Polak. Dr. Polak and I have formed a close working relationship that has been revelatory for us both. We schedule conferences weekly and I audit his course. These conferences have been invaluable as an opportunity for expression, providing feedback and gaining perspective on instructional and motivational problems.

The experimental class was not envisioned as a tutorial experience since these services are available elsewhere. It was established to help students deal developmentally and sequentially with the reading skills necessary for the study of history. In the reading course we use the assigned history texts and begin at the simplest literal level and move to the more complex ability to read inferentially and critically.

The study of history, however, does not necessarily proceed from the simplest to more complex skills; the emphasis is on the chronological or thematic sweep of history which often juxtaposes simple and complex matters. The reading skills course, on the one hand, must stay abreast of the history course. On the other, my pedagogical practice is to develop skills as a pyramid after establishing a firm base. The teaching of reading skills had to meet both requisites since students were immediately confronted with the reality of taking notes, handling difficult and long assignments including source readings, and preparing for essay examinations. Incidentally, the students receive three credits for the completion of the history course and none for the reading course; this makes for bitterness and motivational problems.

Professor Cole: I think it is very important in this program that the reading teacher be in contact with the history class on a daily basis.

Perhaps we could hear about other reading/content area programs from the audience.

Speaker, Staten Island Community College: We're putting into effect a master lecture once a week in con-

junction with basic skills classes. The students meet in sections three times a week. We have two social scientists, one composition teacher, one reading specialist, four interns and two counsellors connected with the program. The freshman program is seventeen hours per week.

A typical program has a general theme, The City. There is a social science lecture, a composition course, reading tutorials. Our assumption is that major difficulties among slow learners are linguistic and the social sciences present a good opportunity to work with them. We do have a problem, however, in finding texts that are not too dry and scholarly.

Speaker, Queens College: In the last two years, Queens College has had to assume some responsibility for Open Admissions students. Our program is based on the assumption that content areas and credit should be introduced in the first year of college. I'm associated with a course called Ethnic Groups in the City. It's a three credit course that attempts to combine content with skills training. We try to treat the course as interdisciplinary. We also try to move from the particular to the abstract in the course of a year. The readings and the examinations get more difficult and the material more theoretical as we proceed. We begin with a comparison of personal and historical material. How to generalize from personal material is an early topic. Then we discuss how so-called ethnic experience often turns out to be class experience.

We've found that our success with students is directly proportional to the amount of time we can spend with them.

Speaker, Medgar Evers College: Our freshman students may enroll in a core program consisting of seven half hours of required courses and four or five hours of laboratory work. Our team is one social science teacher, a reading and a writing specialist, a teaching assistant and a counselor. One hour of instructional time per week is devoted to counselling, one hour to basic skills, three half hours to content area. Four and one half hours are to be used at the team's discretion.

We use content as the vehicle. The major concern of the program are the skills: writing, reading and cognitive development, i.e., study habits, test taking techniques, logical processes. We use mathematics to teach logical processes, for example. The reading people determine the content.

At the end of the year the student takes the freshman composition exam. To pass the student should have an instructional level of ninth grade comprehension and an independent reading level of eighth grade.

Speaker, Kingsborough Community College: We have a system of paired classes. Six credits are offered. Four credits are in the content area and two are in analytical reading. We do have a core of reading specialists, but we rely on English teachers primarily. The English teacher uses the text from the content area.

QUESTION: Has anyone ever made an attempt to teach students how to synthesize material?

ANSWER: I've tried to do it in my own history class. I tried to take a topic around which a model could be constructed and then see how the model relates to other periods in history. It's difficult.

ANSWER: I have done workshops dealing with abstract ideas. We try to approach critical reading, writing and thinking through a focus on self-definition.

Speaker, Herbert H. Lehman College: I've found that the biggest obstacle is that students don't have literal comprehension. Unless a student can comprehend literally what he reads you can forget about analytical faculties.

Professor Cole: I should like to establish a clearing house through the Chancellor's office so that people throughout the City University who are attempting to link content and skills areas can exchange information. I think this description of programs has been very useful. I think we have brought up three points that merit further discussion. They might be described as the aims of teaching skills in the content areas. The first priority is establishing basic, literal comprehension. The we have to consider attempts to teach abstract thinking. And, finally, I think we have to define for ourselves what we mean by college level reading.

Impressions From Two Interdisciplinary Experiments With Underprepared Students CCNY, 1972

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The first experiment was an interdisciplinary course, combining political science, history, psychology, English and CSS for a group of average **and** underprepared students. I shall refer to this experiment as "INTER" for brevity's sake.

My second experiment (the following semester) was a combination of political science with English and CSS. I shall subsequently refer to that experiment as "POLENG" for brevity's sake.

Generally speaking, I view INTER as a failure in contrast to the moderate success (and future potentiality)of POLENG.

INTER: Theoretically much can be said in favor of interdisciplinary exposure of the incoming freshmen. In practice, however, we did not quite succeed in intergrating our three disciplines (plus English and CSS) into one meaningful whole:

(a) A truly interdisciplinary course would have required at least half a semester of preparatory work on the part of the "content" faculty. We had neither the money nor the time to do this and I suspect that this would be also the case in the future. We finally gave three separate courses (each subject a 2-hour session a week and the fourth day all three professor presided over a 2-hour supposedly interdisciplinary discussion session).

(b) The result of this arrangement was that all students had their full program within our framework and no possibility to expand socially or personally beyond the given framework. They complained about it. They felt separated from the rest of the college. They were a "special group"—and they knew they were a special group in a perjorative sense, not a group of the specially talented ones.

(c) The underlying philosophy was that our INTER-framework would represent a sharp and exciting contrast to their high school experience. It was too sharp. With the benefit of hindsight I wonder whether an underprepared student should be exposed to something so radically different; there is nothing wrong with a **good** preparatory high school curriculum and requirements. The contrast should be in terms of quality and individual care, not necessarily format. To quote the coordiantor of INTER, Adrienne Rich: "There were moments when during the 9-11 hours (on the fourth "interdisciplinary" day) students got a glimpse—anxiety-producing to some—of one of the things we tend to take for granted: that professors can disagree, that argument is possible between mutually respecting peers, that no one "discipline" is "right." Adrienne Rich sees the interdisciplinary open disagreement as a good thing, which it is. However, I emphasize her terms "**anxiety-producing.**" We three professors deliberately, and perhaps sometimes artificially, cultivated dissent; I wonder now whether this was a correct procedure for the bewildered, underprepared freshmen, unfamiliar with political science and psychology, and ill-taught in history in our high schools.

(d) Another objection to our INTER experiment was the mix of the students: the average were integrated with the underprepared. The argument for such a mix is well known: "the better students will stimulate and elevate the underprepared to a higher level of critical learning." I am afraid that the contrary has often happened; also a few brighter students tended to monopolize the question periods, frightening the less articulate and shy students into passivity, despair, or boredom. The large size of the class and the "mix" were obstacles to meaningful discussion in the regular lecture/discussion classes: I have to admit, however, that our fourth interdisciplinary (collective) class occasionally succeeded in electrifying the students into a broadly based discussion. One conclusion seems self-evident: if we really want to help our students, classes must be small and seminar-like.

(e) One very positive lesson emerged: while history, psychology, and political science did not succeed in their attempts at interpenetration, the combination of English and College Skills with Content Courses created novel and interesting channels of communication between the instructors as well as the students. And it was this encouraging lesson which had led me to offer my time and energy (above my normal teaching load) to POLENG.

POLENG: The basic idea of POLENG was to graft English and CSS onto my basic political science course (a combination of theory, American Government, and International Relations, with focus on nationalism and national self-determination). The students assigned to us were subaverage.

Jean Wiles (CSS), Jerry Gould (English), and I agreed on one book to be used in all three sectors with different emphases, techniques and perspectives (Orwell's Essays). We visted each other's classes and participated in discussions whenever our special knowledge could contribute something different. (While the English instructor pointed to Orwell's style, I emphasized the political meaning of the same statement and so on). Anything negative? Certainly:

(1) Both I and Jerry Gould became seriously ill during the semester. After the promising start, I, in particular, barely finished the semester before undergoing a major operation in which my capacity to speak was at stake.

(2) I made a mistake in trying to cover what, in my conscience would be a justifiable 3 credit course (introductory) in political science. Depth rather than a general view would have given the students a better preparation for their future college work. The next time I plan to focus on a few basics to be discussed at a leisurely tempo; or adhere to the usual content of an introductory course, but extended over two semesters. Briefly, I advocate a combination of a content course with English and CSS in a form of a slow track course.

It was also an error on my part to schedule the projection of political films (Gandhi, Cuban Missile Crisis, Bay of Pigs, etc.) too late; I should have shown them starting with the third week. They have proved an extraordinarily good tool in eliciting interest and analytical comment.

Suggestions

The following suggestions are based on a not too successful INTER experience and on a more successful POLENG, which, however, was plagued by the sickness of two out of three instructors:

1. The combination of a social science or humanity discipline with English, CSS (and possibly Speech) is highly recommended.
2. Such a combined course should be in a slow-track category rather than marked by an unrealistic hope that underprepared students can by this method still complete the college in four years.
3. I do not abhor the idea that such a course would be run deliberately as an "enlightened high school course" in the first half of the semester.
4. The classes should be small and consultations with the instructor frequent.
5. In the first 5 to 6 weeks no reading assignment should be left for home study alone. Everything should be reexamined in class. The greatest handicap I could note in my students was **not** a lack of motivation, **not** a lack of interest, **not** a lack of industry but simply their lack of ability to detect what the central idea or concept in a paragraph might be. The good effects of CSS manifest themselves much too late for the purpose of the first test. Right from the beginning students must be guided toward distinction between important **vs.** marginal, and conceptual **vs.** merely illustrative material.
6. Short quizzes and tests should be very frequent (I suggest every 2 weeks), even though students will complain. They should be successively exposed to all kinds of quizzes; multiple choice, selections, identifications, expanded identifications (that is, identification plus student's opinion "why" this or that), and guided essays (essay questions which state what should be in the first, second, and concluding paragraphs).
7. I also recommend that students should be somewhat better screened than was the case in Political Science 70. I have in mind students whose mother tongue is not English. It was a truly pathetic sight to observe one Chinese student using a voluminous Chinese-English dictionary during a 10 minute true/false quiz concerning the U.S. Constitution.

Is the above also a comment on the New York City high schools? I think so. I have noted time and again how Blacks from the Caribbean (including **French** Haiti) have superior study habits and an ability to handle new concepts or illustrations from American history (unknown to them) more effectively than the New Yorkers.

In my introductory international politics course I usually give an unsigned quiz in the first contact hour to determine the general level of alertness, interest in current events, and knowledge of some terms to be used by me in the first lecture the following day.

Linked Classes

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Kingsborough Community College's initial experiences with Open Admissions students were similar to those in CUNY. We, too tried several different textbook attacks. We began a tutorial program. We started a reading/writing workshop. Each approach, on paper at least, seemed a satisfactory initial attack on the problem facing us.

As time elapsed we all fully realized that students entering college under Open Admissions were, in many instances, severely deficient in listening/reading/writing/studying skills. The young people we were teaching were required by the New York City Board of Education to have only a reading achievement of 8.0 on a standardized reading exam before graduation from high school. Those of us with a knowledge of the literature on improving reading achievement scores are fully aware that a 15 week college semester does not permit the time needed to enable a student to raise his reading achievement grade level to one commensurate with our college level textbooks. And, of course, if we put our energies into raising standardized test score results, we should not be facing adequately the task of helping these students to "cope" with college level subjects.

Fully cognizant of this situation, we at Kingsborough felt the best method for helping all our students was to prepare them with the basic tools for success in college level subjects. We felt that learning how to handle textbooks, learning how to organize ideas, learning how to evaluate reading materials, learning how to use the library, and learning how to study efficiently were essintial minimum requirements for success in college. While we were teaching these variousskills,however, our students did not seem "to pull it all together" and apply the skills learned to other disciplines. To try to overcome this problem of transferring learning and to motivate desire for advanced learning tools, Kingsborough's Freshman English Committee began to experiment with "linked" classes whereby entering freshmen are preprogrammed in accordance with student area of degree preparation. A Liberal Arts student, for example, ordinarily takes a course in sociology during the college career. Under the "linking" system, 20 students, recognized as deficient in certain basic skills as determined by an exam administered prior to registration, would be programmed into a particular section of English linked/section of sociology. These 20 students would now have the same sociology instructor and the same English instructor.

We have found linking has the following advantages:

1. Students are immediately aware of the importance of success in both classes.
2. Motivation is extremely high.
3. The textbook used in the English class to demonstrate reading/learning/study skills techniques is the text used in the linked class.
4. Both instructors meet to discuss individual student progress, class progress, special skills for linked subject class.
5. The teacher of the linked class develops greater awareness of students' reading and writing abilities and begins to analyze his choice of textbook and the types of exams and research for which he holds his students responsible.
6. Both the teacher of English and the teacher of the linked class develop an overall awareness of college life beyond an individual discipline.

This is not to say that we have removed all the problems of Open Admissions. We still have student inability to understand the new vocabulary; we still see slow plodding to understand the sentence and ultimately the paragraph. What we have achieved is a greater degree of success in creating student sense of purpose. Students understand how learning/listening/reading/studying skills help to achieve college success.

The Sixth-Grade Reader in College: A Realistic Prognosis

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We give him a reading test. But he lacks confidence; he tends to become confused. He looks at each item in a passive way, hoping the meaning will come through to him. He makes a pattern on the answer sheet. When we score the test, we find that we are dealing with a student who is reading at the sixth grade level.

What are the characteristics of this student, and what can we expect to do?

In my opinion, a crucial weakness is the student's distance from the language he is expected to read in college. The student's own language, standard or nonstandard, may enable adequate communication with peers, but this is not the language appropriate for college. If standard written English is, as has been noted often, a special dialect of the English language, the English of textbooks is a special variety of the dialect. Our student neither speaks nor writes it.

Structurally, written language of this student resembles English described by Dr. Ruth Strickland in her study of the language of first graders. When the student reads aloud a typical textbook sentence opening with **it** or **there** or inverted in structure, the variance is evident.

Here's an example. A student was asked to read aloud a sentence which had presented difficulty on a reading test:

Not unless the rains were unusually heavy that year did the farmers have a good crop.

Baffled by a sentence opening with **not** and **unless,** he read them as individual words: **Not...unless.** After a moment, he grasped what he thought came next, and read: **The rains were unusually heavy that year.** A moment later, in a satisfied way, he read this question: **Did the farmers have a good crop?** Total meaning, zero. He used intonation patterns he already knew to fit together the parts of the complete printed sentence. He lacked completely the over-riding intonation pattern fundamental to the meaning of the sentence as a whole.

One authority suggests we must have a psycholinguistic theory for reading that "emphasizes the major but generally unrecognized role of intonation and inner speech in silent reading. This theory holds that large, over-riding intonation patterns delineate meaning-bearing syntactical patterns in English."[1] More specifically, Professor David Eskey suggests "the syntax of unsimplified written English typically exhibits a degree of complexity much greater than that of the spoken language" and "advanced English structure should be taught to students who must tackle such English reading, and that it should be taught in connection with this reading."[2] It has been demonstrated that familiarity with the structural patterns of the language leads to greater achievement in reading. Dr. Virginia Allen, who participated in San-Su Lin's well known experiment in pattern-practice, reports:

Somewhat to the surprise of the staff, scores on the Cooperative English Test revealed that the experimental groups made greater gains in **reading** after a year of grammar pattern practice than did the members of the control group. What made this result the more striking was that the control group...had given more attention to reading, as such, and to discussions of the material read.[3]

Dr. Marion Jenkinson, addressing the National Reading Conferences, cited a number of doctoral dissertations linking ability to handle syntax with reading comprehension.[4]

Here's one way of looking at the problem. A student speaking or writing can choose his words, sentence structures, figures of speech, references. He has all these options. But, when he reads he has no options. The language of the passage is precisely as it appears on the printed page. He can express, for example, orally or in writing "keeping up with the Joneses," an idea familiar to him. But he cannot begin to read a passage from Thorstein Veblen expressing this same idea. For the student, it's almost as if he is attempting to read a foreign language. Many of the words are familiar, but he loses his way among Veblen's sophisticated structures. With patient tutoring, he may appreciate many concepts hitherto unknown. Unassisted, he cannot comprehend them from the printed page.

A contributor to the **Journal of Reading** suggests the low-level reader needs, first a structured oral practice like that mentioned by Dr. Allen and Professor Eskey. Oral practice is a powerful teaching device, since the student learns at once the structure **and** the accompanying intonation pattern, basic to the meaning of the sentence as normally "heard" through the phenomenon of inner speech in silent reading. After oral practice, the writer suggests, written practice should follow, then work in reading.[5]

At the Community College of Philadelphia we have a 2-semester language curriculum designed originally for use by deaf and foreign students who have completed a period of oral practice; at present it has been extended to include other groups. Such an approach, with an added sentence-oriented remedial reading program designed to build sentence sense, is possible for a severely retarded reader. It is, however, a long-range approach.

Suppose we have a student for but one semester. In realistic terms, what can we expect to do for him?

I try many methods, usually using reading material from simpler college texts for motivation, but with some in the textbook manner that I write myself. I approach terminology directly. A good technical exercise is to look for key terms, concept words, as distinguished from less vital vocabulary items. A student of elementary biology, for example, should make a list of key concept words used in that course for his reading teacher; if possible, he checks list and definitions with his biology teacher.

Another good exercise is practice with sentence summaries to select, from a short passage, generalization and major supporting details. Oral, followed by written practice class, with the teacher at the board, can be repeated often since it takes little time.

Simulation techniques are quite valuable. Hypothetical examination questions based on passages in relevant fields produce, again, both generalization and supportive points. This is the best way I have found to teach poor readers the relationship between a generalization and its support. Its first step is to decide on the form of the answer: 1 sentence, 2 sentences, a paragraph, 2 paragraphs. Here are two examples. On a 50-minute quiz in

geology, a question could be: "Explain the weathering process in general." An external authority always impresses students more than a statement from one's own instructor, so I give my students this advice from Dr. Leslie Nason of the University of Southern California:

In writing essay-type tests students should be careful to answer each question precisely in the very first sentences. Illustrations, examples, and further discussion should be included only after the question has been answered directly.

The class considers the passage, formulates a first sentence for a direct answer, discusses material to be included, after which the students write. A history quiz may have the question: "Discuss the prospects for national unity in the United States of 1790." A class invariably finds factors noted in the chapter that work for against unity; a 2-paragraph answer naturally results. After a brief discussion of possible opening sentences and of transitions between paragraphs, students write.

Videotaped lectures in a classroom situation by college instructors—another simulation technique—are good motivation in instruction for listening and note taking. I found that a filmstrip used early in our biology course also was useful. Students are permitted to use notes during a brief quiz on the material of the lecture or filmstrip. Note taking on a text passage, with 1 page of notes permitted, produces high motivation when students can use such notes for a later test. Working in small groups is advantageous as an aid in deciding content in the test. Sometimes I tape record a question-and-answer session of the kind that often occurs when a class has read a textbook chapter for a subject-matter course. It gives students an opportunity to hear their own recitations and how they sound.

What is the result?

In one semester, apparently we can lay a foundation of some kind for reading improvement. It will not be much more if the student begins as a sixth-grade-level reader. In spite of my best efforts, my post-test reveals no really significant improvement in reading scores on the part of a number of poor readers. I must comfort myself—and this is actually a real comfort—that the student's accuracy rate has improved. Rather than attempting 40 items with 12 correct, perhaps the student tries but 25, and has 16 correct. **Something** has happened!

In fact, I feel we can produce a reader who is more active, with more confidence and with more ability to concentrate. I do not feel, however, that in one semester actual skills can be improved to the point where the student can handle the kind of textbook reading he will encounter in a course whose subject matter is on the college-level. Nothing would please me more than to have someone explain to me how to do it.

FOOTNOTES

[1]"The Simplistic Standard Word-Perception Theory of Reading," **Elementary English**, March, 1968, p.2.

[2]"A New Technique for Teaching Reading to Advanced Students," **TESOL Quarterly**, December, 1970, p. 318.

[3]"Teaching Standard English as a Second Dialect," **Teachers College Record**, February, 1967, p.369.

[4]Address to the National Reading Conference, December 2, 1969.

[5]Jack B. Krail, "The Audio-Lingual Approach and the Retarded Reader," **Journal of Reading**, November, 1967, p.93.

In-Service Training For Faculty in Reading Improvement Divisions and Natural Sciences

IRENE MARTIN
Allied Health Learning Center
New York City Community College

An Open Admissions policy for the City University of New York has been in effect since September 1970. Since the adoption of this policy the level of student academic preparation often falls far below the minimum levels necessary for successful completion of the career course of study. For many, organizational skills need development to enhance learning through lecture, laboratory, and clinical experience. Students, for example, enrolled in courses in the Natural Sciences, often because high school course content does not meet the prerequisite levels necessary for survival in freshman courses, need additional preparation to meet the rigorous curriculum designed for a course of study resulting in local, state or federal licensure and/or certification examinations. To complete the course of study and acquire necessary certification seem overwhelming tasks to Open Admissions students. Educators should explore possible options for a continuation of higher education that will enable students enrolled in career and transfer programs to widen their horizons to include a vast range of educational opportunities.

A Learning Center is a comprehensive network of support systems designed to facilitate student learning and utilizing a team of content faculty, remedial specialists and tutors for preparation and implementation of a series of mutually complementary strategies of learning.

The Learning Center staff focuses on application of remedial techniques, methods and materials as well as specific content areas in departmental courses to achieve the objectives projected. Activities creating such an environment appear below.

Diagnostic Testing and Base Line Data

Diagnostic tests are to be developed to prepare precise prerequisite vocabulary, reading comprehension, and related content skills necessary for entering freshmen to succeed in their first term course of study. Comprehensive reviews of high school records aid student placement for remediation, prerequisite training or first-term programming.

Tutorial Assistance

Tutoring is a complex process based on sensitivity to individual student educational and emotional needs. Effective tutoring achieves mastery of subject matter involved through supportive tutorial assistance with, its ultimate goal, student self-direction.

Today tutorial assistance as enlarged supports many learning situations, including both open laboratory and multi-level Learning Center.

Freshman Study Skills Mini-Course

Courses offered to freshman students deal with reading and study skills applied to a specific content course within each curriculum. The Learning Center staff consults content faculty members to analyze required readings within the content curriculum.

Sequential Modules of Instruction

Instructional modules as developed for the needs of students with varying backgrounds and educational skills encompass single-concept units of learning in a framework conceived with reference to prerequisite skills, current curriculum and enrichment activities.

Supportive Media Aids

An available media team works with faculty to design and develop supportive instructional aids for classroom use, tutorial sessions, and student reference. The team utilizes college production resources.

Media Cross Reference

Several college locations house material where faculty, who must be made aware of existing resources, can secure aids applicable to the content of their course. A system of cataloguing media available in the college and from commercial sources is needed to ensure presentation of material and adequate experience to aid new and experienced faculty in the teaching of new courses.

Student Development Workshops

Student Development Workshops analyze educational options and occupational opportunities available to students. Various career choices are defined and procedures for continuing education and assessment of goals are examined.

Reading in the Content Areas: Humanities

EDWARD SELTZER
Department of Philosophy
Queensborough Community College

I shall discuss the relationship between studying the humanities and learning to read with reference to the subject I teach—philosophy. The approach I use to incorporate the reading of philosophy into the teaching of philosophy is not necessarily the only one possible.

One of the first difficulties a philosophy teacher faces is that philosophy is a subject with which most students are unfamiliar. Unlike European college students, our students rarely have encountered it in their pre-college education. The typical American student reacts to philosophy by assuming the subject is either too difficult to master or is irrelevant. Once registered for a philosophy class, many students take a "show me" attitude, essentially different from that shown to other courses for which they have enrolled. Such students already believe these subjects are of value because authority establishes the course in a particular concentration leading to a degree.

The situation of the philosophy teacher can be both burden and challenge and their common term is the teacher's personality whose importance has been evident since Socrates. Socrates himself recognized that the philosophical attitude can be found in anyone "...who has realized that in respect for wisdom he is really worthless." For Socrates, a "teacher of philosophy" is not someone who imparts knowledge to the ignorant, as a man fills an empty cup with water. Rather, a teacher of philosophy is one who stimulates the desire for truth in those with whom he converses. Socrates believes no genuinely human existence is possible without the inquiring mind.

Like Socrates the classroom teacher of philosophy must show that thinking is valuable and that truth should be followed wherever it may lead, even into ways that depart from the routine or the acceptable. I have found critical and analytical thinking is best in an informal setting where students come to regard others as participants in a common quest. In the search for truth, a teacher must be careful not to assert the prerogatives of authority. In itself, a self-justifying authority is inimical to the existence of the philosophical temper. The ideas of great philosophers are introduced not as dogma but as theories whose presuppositions open to critical scrutiny. My aim, then, is to teach philosophy as a method of critical inquiry rather than to teach it as a system of eternal verities.

The type of philosophy course sketched above is suited to our students since it addresses itself to the ultimate questions most college-age people regard as important, questions dealing with human significance and aspiration. Again, it begins from a skepticism similar to that expressed by many students toward traditional answers to such questions, and finally, it emphasizes conversation, the process of talking out questions of mutual concern with one's peers.

The philosophy teacher can use student strengths to their mutual advantage for he can make the student aware that questions of ultimate concern are philosophic in nature; the teacher can attempt to change the skepticism of the student from cynicism to a "healthy skepticism," an attitude that values the critical capacities of human reason when it attempts to disclose the truth; and, finally, the teacher can attempt to lead his students to recognize that a group sharing specific philosophical interests constitutes a peer group.

The foregoing discussion is preliminary to but necessary for a consideration of the place of reading in the teaching of philosophy. I have found students read an assignment only if they believe it to be of value to them. Therefore, it is a function of the teacher to generate or to encourage student interest in the subject. Reading critically is difficult. Many of our students are poorly prepared for it because their previous education had not required them to read with critical understanding or because their culture does not regard the written word as an important means of access to ideas. Most students accept their own experience at its face-value, as immediate and self-sufficient. Reading is an activity ultimately requiring the reader to penetrate the surface of the written word before he enters into the depths of its meaning.

The teacher of philosophy must take care in selecting assigned readings. An appropriate reading selection depends upon the goals of the course. Often it is difficult for students to read selections that employ a vocabulary and a syntax no longer in ordinary usage. Such materials present unnecessary difficulties for students if the aim of the course is to train them to read critically. The teacher must offer his class reading materials that state the problems of philosophy and their possible analyses adequately and with relative simplicity. Rather than "watering down" course readings, the task is to find in written language philosophical ideas so written as to make them accessible to our students. The search for adequate reading material is always ongoing, a process of experimenting with different reading assignments, constantly testing these assignments against the capacities of the students and the goals of the course.

The philosophy teacher does not teach reading as a skill for its own sake. The teacher uses reading materials to achieve the aim of the course, namely, to develop critical understanding. Reading should be taught by the teacher of philosophy as one way in which students can engage in a dialogue with another thinker: it involves a process of communication that actively engages the reader with the writer in the process of revealing the truth. We can consider this conception of reading as a form of intelligent activity: it is intelligent in the sense that it involves adaptive interaction between student and environment. In this instance, the latter is the world as constructed by the written word.

There are specific classroom procedures to nourish the growth of reading as an intelligent activity. The teacher can convey to his students how he expects them to read by reading critically significant passages from the reading assignment. Through this demonstration students discover a model by which to consider other reading selections. The teacher must be careful his students do not follow the model as an absolute and slight the effort required to reach a conclusion. The teacher must emphasize the student should focus his attention on the process that intervenes when we move from a question to its answer. By just this process, final judgments can be

reached and this is of central interest to the teacher of philosophy.

The teacher as a research person also can help his students read philosophy by devoting sufficient class time to elucidating the meaning of specific key terms. Students become aware that words have a history that the teacher reconstitutes. Words such as "justice," "soul," and "God," are of central importance to philosophy whose meanings and contexts have changed with the passage of time. The teacher's explanation always should include a discussion of the circumstances, historical and intellectual, that have occasioned a revision of a word's meaning. Finally, a teacher must relate technical meaning to everyday meaning; this enables students to order meaning's multiple senses. Classroom activities as outlined above can give students tools necessary to read their assignments intelligently.

The teacher of philosophy must be sensitive to the reading progress of his students. Again, this can be accomplished by using the Socratic method of questioning, both oral and written. Such questioning can ask that students reproduce in their own words the sense of what they have read. Of even more value, it can ascertain whether students have reached deeper levels of understanding through their skill in drawing inferences from their reading and in relating the structure of what they read to similar and dissimilar material.

In summary, I believe a teacher of philosophy needs varied approaches, different methods, to help his students to understand assigned reading material. However, no approach the teacher uses can be applied mechanically: a teacher must be conscious of the immediate classroom situation and alive to its dynamics if he is to attain a fundamental goal and awaken in his students a desire for knowledge. For the teacher, reading serves to effectuate that ideal.

Innovative Methodologies in Reading Improvement

PHILIP STANDER
Department of Behavioral Sciences
and Human Services
Kingsborough Community College

The presentation and workshop provided by the staff of Voices, Inc. at the CUNY Conference, initiated a national program wherein university professors and theatrical performers united to inaugurate a unique and innovative multi-sensory experience in communication. Embodied in the performances of Voices, Inc. the project is supported by a grant from the Education and Expansion of the Arts Programs of the National Endowment for the Arts, as "The Touring Teacher Artist Program."

The program assumes the most effective learning results from a multi-sensory approach that evokes emotional, visual and cognitive responses from participants and observers. By intensive involvement, those involved should experience a new commitment to, and love for, learning difficult to obtain when utilizing more traditional methodologies.

The two-part session, "Innovative Methodologies in Reading Improvement," is first, a presentation, "Journey Into Blackness," a musical and dramatic review of Black History in word, song and movement; thereafter, a workshop follows.

Bantu chants, field works songs, street cries, spirituals, rhythm 'n' blues and jazz, develop an abbreviated history of the Afro-American from his African culture through the generations of slavery to the present day. In turn, driving rhythms, dynamic dances and dramatic portrayals of the American Black man, past and present, are the means by which to excite empathy with and interest in the historical issues illustrated. The group is remarkably versatile in its presentations of the gamut of Black historical experience, and Black response in its manifold expressions.

Major participants in the workshop included Jesse DeVore, Managing Director of the performing group, and Dr. Madelon Stent, Professor of Education, City College, Director of the National Right to Read Programs, Chief Consultant to Voices Educational Service and guiding spirit of the performing unit.

Presentation and workshop alike make clear that utilization of Black images and identification are modes to stimulate development and improvement of English and writing skills. The challenge to the educator is integration of the nation's curriculum so Black images with whom youth can identify are represented. To meet the challenge is to restore America's past by making the Black men live who have had so decisive a part in the shaping of the Western world. The task proves progressively less difficult as this success shows.

The educator need not create a Black History and culture, for it is there with its fascinating and inspiring array of heroes and villains, great men and small, leaders and rebels, inventors, artists and scientists, and is, in fact, no different in kind from that of all the nationalities who have made America.

No, the educator need not write a Black history. Already it has been written and rewritten for all grade levels, for all levels of ability. It is available in hard-cover books, paperbacks, film strips, recordings, movies and programmed courses. So, too, with new curriculum guides to demonstrate integration of Black histories into present courses. Good ones have been developed, used, tested, and found workable. We still need and, analogously, can produce such materials in art, music, literature, science and in the school library.

In fact, we already have achieved development of multi-racial, multi-ethnic textbooks that, through illustrations of children with different ethnic backgrounds, provide a realistic current interpretation of our pluralistic society. Entire series of inexpensive paperbacks and hardcover books on minority groups are being published.

Intensive student involvement, exciting and generating commitment to learning, such as this Conference presentation and workshop demonstrates, should lead to continuing dramatic improvement in reading and communication skills. We anticipate the opportunities for sharing educational methodologies, provided here by Professor David Keller, will continue in CUNY's Conferences of the future.

Reading Plenary Session: "Conclusions and Proposals"

PAUL PANES
Department of Basic Skills
Queensborough Community College

Our purpose for the next hour or so, is to sum up the highlights of the workshops that took place yesterday and today and, perhaps most important, to exchange ideas and reflections about these workshops and make recommendations for the future. A conference like this can accomplish so much and no more. One of the most important things that can come from a conference is the follow-up. We've had very little follow-up in the City University among reading and writing skills teachers. Thos of us who wish to pursue further some of the things we heard yesterday and today, can begin by meeting and exchanging ideas here.

I want to do three things at this plenary session. First, I'd like to spend four or five minutes presenting a summary of the workshops that took place yesterday, this morning and this afternoon. Second, I've invited some of the workshop leaders to present specific highlights of their workshops and make recommendations based on their reflections. Third, perhaps we can make specific recommendations for future action.

The reading workshop programs at this third annual conference seemed to stress the bread and butter aspects of reading improvement instruction, and to deal with the specific problems and experiences of the City University staff. This approach is somewhat in contrast to the typical reading improvement conference which often concerns itself primarily with more theoretical aspects of instruction and methodology. During the past two days our conference, for the most part, presented specific problems and possible solutions experienced by our staff in their everyday teaching responsibilities. Thus, we heard a detailed description of the reading programs conducted in several CUNY units, including diagnostic and methodological procedures.

In many colleges, reading classes are offered in coordination with classes in history, social sciences, English, biology and other subjects. Many teachers are developing basic reading skills by employing specific content area text books. Students often register for a content course and then attend skills classes in which the instructor guides the student by teaching relevant reading and study skills necessary to meet the demand of the content area course. Team teaching, coteaching and skills core approaches are being tried. Often there is joint planning of curriculum by the content area teacher and the reading teacher. Other programs require that students attend remediation classes as pre- or corequisites for subject matter courses. Students attend classes in which subject matter text material is employed to develop skills but the reading course is not offered as a complementary course to any specific subject matter class. Other programs are laboratory oriented. Students are evaluated and then follow individualized programs under supervision in a laboratory setting.

The workshops on reading improvement in the content areas and in team- and coteaching approaches where close interaction between reading teacher and content area teacher is involved, indicated several advantages over reading programs that are offered in isolation. First, it is felt that there is greater student motivation. Students seem to be more willing to apply themselves in reading improvement classes when they are matched with content courses. Students feel greater continuity because their reading and study skills needs in the content course are being met directly in the reading class. Second, instructors sense that impressive gains in the content area subjects might be due essentially to the supportive work done in the reading skills class.

However, some caution must be exercised. Is the back to back skills course only tutoring for specific subject matter, or is it really a skill development course? Does the instructor use specific content materials to develop essential skills that are applicable to all types of subject matter? Or does the instructor merely offer tutorial support and review required reading assignments in a manner that does not develop skills? Can the reading teacher meet both the demand of the subject matter course and offer instruction in the essential skills that comprise the reading process? Ideally, both can be done. And under no circumstances should skill instruction be sacrificed. Open Admissions policy has made the subject matter teacher aware of the necessity of teaching methodology that serves the learning process. It has become imperative that the subject matter specialist become more adept in recognizing and providing for learning problems in the class. At one time, not too long ago, reading specialists on the secondary school level cried out: "Every teacher should be a reading teacher." It just didn't work out. The subject matter teacher is concerned primarily with teaching the subject. The subject teacher feels he should not be concerned with skills that students should have learned in the earlier grades. And I think our college faculty reacts similarly, even with the advent of Open Admissions and its concomitant problems.

However, as our workshops on inservice faculty training exhibited, there can be an effective working relationship between a content teacher and a reading specialist. Procedures that range from simple dialogue concerning learning problems in a classroom to structured inservice faculty training sessions offering guidance to content teachers are operative and effective. These situations also result in mutual learning. The reading teacher becomes better informed about the learning disabilities problems confronting the subject matter teachers. And it would seem that continued dialogues and structured inservice faculty training sessions conducted in an atmosphere of open-mindedness and receptivity can prove to be productive and extremely helpful to both specialists.

Another sensitive area for reading teachers is the instruction of foreign students. English as a second language is not an uncommon course offering in most CUNY units. However, more often than not, the ESL specialist seems to be better equipped to teach the writing skills components of the course than the reading skills. Thus, quite often, foreign students receive little effective assistance in the sub-areas of reading instruction. Our workshops on ESL demonstrated several techniques in reading skills instruction. It would seem that one possible route toward correcting this deficiency would be to require those programs leading to ESL degrees to in-

corporate more courses to familiarize the graduate student with the reading process and the nature and relevance of sub-skills in reading and how they are taught.

Tutorial asistance has been widespread in the City University since the inception of Open Admissions. Undergraduate and graduate students have been offering tutoring services in subject matter departments. In addition, as we heard in the workshop concerning tutorial assistance, the student tutor has a place in reading improvement programs. Student tutors have been able to assist the reading teacher by rendering individual tutorial assistance to those students who require supplementary assistance beyond the work accomplished in the classroom. One workshop touched upon a very basic problem confronting reading improvement instructors in CUNY. In the workshop just completed, entitled "Assessment and Evaluation of Reading Programs," college administrators and reading teachers had an opportunity to discuss the purpose and value of reading improvement programs on the college level. Perhaps the most essential problems considered were these: what should be expected of reading improvement programs on the college level; what can they do and not do; what does the college administrator expect from reading improvement courses; what does the subject matter teacher expect; and what are reading teachers expecting to accomplish? Does the reading teacher transmit an idea of what he or she expects to accomplish to the college administrators and to the subject matter teachers? The impression I received is that many administrators who have evaluated reading programs feel that many of these programs are nebulous and unclear. Essentially, the administrators told us that there is a need for more effective communication between the reading staff of the college and the administrator.

In a very general way, and very quickly, also, I've summarized what I consider to be the key points of the workshops that took place the past two days. But much more happened than I've suggested. I've asked Shirley Aaronson, who chaired the workshop on reading in the content areas of social science, and Lila Soll, who participated in the reading workshop on team teaching and coteaching, and Irwin Bergman, who was involved in the workshop on tutorial assistance, to spend a few minutes giving us the highlights of their workshops. Perhaps when we've heard them we can come up with some recommendations. Lila, would you care to start us off?

Lila Soll: For those of you who were not in the workshop on coteaching, I will summarize it quickly. There was a presentation by two teachers at Lehman College who have worked out a curriculum with a particular history teacher. It sounded very exciting and very very valuable except that only 14 students were involved in one program and 9 in the other, and we all know that what we are doing in the colleges must include a much larger number than that.

At the same workshop I briefly described the program we have instituted at Baruch College. We feel very strongly the better the relationship there is between the reading program and the total college program, the better chance there is for success of each student. The program we've institued at Baruch College is for students with the lowest scores in an English essay test, who have been traditionally placed in the lowest part of the remedial writing and reading program. It is an interdisciplinary team teaching program, consisting of a reading specialist, a writing specialist and a speech specialist. This program currently involves 350 students and 17 teachers.

In general, the programs that bring content areas together with the basic skills are the most promising and most exciting. Open Admissions has made both content and skills teachers aware that we can no longer remain isolated from one another.

Shirley Aaronson: The feeling in the workshop I presided at with Steve Cole was also that this meeting of content area people and reading people is extremely worthwhile. It's an idea whose time has come. Content area people especially have to realize that they can't isolate themselves any longer in their own daily work. And reading teachers have to get over the idea that they're simply helpmates to content area people. They have identities of their own. They have a great deal to give to content area people. We all have one job to do and that is to work with students. You've heard here about the many multifaceted forms of integration with content area people. At City College and at Staten Island Community College, they've been using theme teaching. At Queens College, they've been using theme teaching, too, in terms of ethnic groups. They've been using team teaching at Lehman and Brooklyn Colleges, and peer-teaching at Kingsborough and Queensborough Community Colleges. They've been using coordinated teaching at New York City Community College and at Medgar Evers. The interdisciplinary approach has been used at City College with very interesting results. At City they seem to be in complete harmony and are aware of each other's faults, and each other's strengths, and are working toward a common goal of helping students function better in college. It was very good to hear.

What are the feelings engendered by programs that integrate skills and content teaching? Apparently, the people using these programs are quite satisfied, and so are the people implementing them. One teacher at New York City Community College felt that as a result of coordinated teaching, he can project his ideas much better. Now that reading and writing teachers handle those problems, he is much freer to work with students on content. Another teacher felt that as a result of the experiment in history, his classes were more alive than ever. Students ask more questions. He began to think about the learning process so much more that it became a much more real experience for him. Another teacher reported that he structures his lectures better. He doesn't just talk. He tries to structure his lectures so students can comprehend them better, can organize them better, can take them down better. In other words, what has been coming out of this is a greater awareness that teaching is an art and you really have to put all of your self into it.

Of course, there are many things that have to be changed. There are many difficulties. There are still students who should have instruction in basic skills before content area integration is possible. There's also a problem with texts. We have to learn to help scholars write better so that students with reading problems don't have to cope with sentences that are dull and overly complex. Teachers have to dispense with the idea that they can just get up and lecture. They need to become

much more aware of the process of learning. This is something I think reading teachers have always been concerned about, whereas content people tend to concentrate on their subject more than on the learning process.

As a recommendation, it would be a good idea to have a clearing house for all of these ideas that are now coming out of all the different units. In other words, there should be one place where people who are interested in starting similar experiments can go to get ideas. There should be more inservice training for teachers in terms of what readability and study skills are all about. Better choice of texts is crucial. The text is such an important instrument in the learning situation, that a poor text is an impossible frustration to student, content area and skills area teachers.

Irwin Bergman: At our workshop there were two categories of people: supervisors and tutors in the basic skills or remediation departments, and supervisors and tutors from the specific content areas. In spite of the different backgrounds and professional orientations, there was virtually unanimous consensus on six broad areas: 1) A college reading program must involve not only the teachers and tutors of remedial basic skills, it must also involve the faculty and tutors working with students in specific content areas. Every faculty member and tutor present felt that reading and study skills were at the heart of students' learning problems. 2) Any college reading program must involve professional inservice training of the tutors involved. Some of the tutorial supervisors felt that they needed some release time from their classroom duties to do this effectively. Some supervisors reported that they were already being given release time for this purpose. 3) To be effective, open channels of communication are essential on many levels in the tutoring process. Several tutors felt that some faculty members do not adequately pinpoint the areas in which they would like their students tutored. Faculty members should discuss specific problems with their students even before they are r erred to the tutors. Many students are sent to tutors and some of them don't know why they are sent. They tell the tutor, "I don't know why I'm here. The teacher just told me to come here." 4) It is important that tutors have specific objectives. Equally important, tutors should know what they are not expected to do. Tutoring is not supposed to be a substitute for effective classroom teaching and discussion. While encouraging the student the tutor should not look upon himself as a skilled psychoanalyst. If the tutor feels that the student's major problem is personal, he should not hesitate to make a referral to the supervisor, or to the counselling staff of the college. 5) Tutors also reported that the readability level of many of the textbooks is not always appropriate nor does readability often match student aptitudes, abilities and needs. A careful review of the textbooks being used would seem to be in order. 6) Money. Most of the supervisors felt that their tutoring budgets are inadequate. Some of the supervisors indicated that at the present rate at which they are spending, they will be out of money by the end of January of February of this academic year.

The opinion was virtually unanimous that tutoring in reading and study skills, even on a college level, has in a sense proved itself, and that it should be an integral part of the City University program to which all of our students are entitled.

APPENDIX
THE THIRD ANNUAL CONFERENCE OF THE CITY UNIVERSITY OF NEW YORK
CONFERENCE PROGRAM

WEDNESDAY, NOVEMBER 7, 1973

8:00 a.m. - 9:00 a.m.
REGISTRATION WINDSOR GALLERY
COFFEE WINDSOR TERRACE & COURT

9:00 a.m. - 5:00 p.m.
MATHEMATICS IN ACTION STUDIO 102
READING IN ACTION STUDIO 119
FACULTY LOUNGE CLUB SUITE EAST & WEST

9:00 a.m. - 9:45 a.m.
PLENARY SESSION WINDSOR BALLROOM

Host, President Leon M. Goldstein, Kingsborough Community College

Greetings: Chancellor Robert J. Kibbee, City University of New York

Keynote Address: Vice Chancellor for Academic Affairs Timothy S. Healy, City University of New York
"New Problems, New Hopes—The Case for Open Admissions"

The Conference Theme: Professor David M. Keller, Director

WORKSHOP SESSIONS
10:00 a.m. - 12:00 noon

ENGLISH WORKSHOPS
10:00 a.m. - 12:00 noon

Assessment of Learner Strengths and Weaknesses: Placement and Diagnostic Testing I—STUDIO 131

"Testing and Its Relationship to Exit Goals"
Roderick Loney, Chairperson, Department of Academic Development, Medgar Evers College, Host
Ralph Dawson, Nairobi Research Institute, California State University
Andrew Henderson, Department of Academic Development, Medgar Evers College

Preparation of Open Admissions Teachers I—STUDIO 127

"Criteria for Selection of Open Admissions Faculty"
Beryl Bailey, Department of English, Hunter College, Host
Alan Cooper, Chairperson, Department of English, York College
Hortense Sarot, Coordinator, Basic Writing Workshop, Department of Freshman and Developmental English, Hunter College
Jennie Wells, Chairperson, Department of English, New York City Community College
Howard Nimchinsky, Chairperson, Department of English, Kingsborough Community College

Dynamics of Classroom Organization I—STUDIO121

"Setting the Problem: From Traditional Lecture to Interaction"
Stephen Weidenborner, Director of Freshman English, Kingsborough Community College, Host
Technical Assistance provided by The Guidance Laboratory, City University of New York

The Components of a Freshman English Writing Program I—STUDIO 118

"The City College Program"
Mina Shaughnessy, Director of Freshman English, City College, Host
James de Jongh, Department of English, City College
Nancy Lay, Department of English, City College
Myrtle Bates, Department of English, City College

Interdisciplinary Approaches to Writing Skills I STUDIO 107

"The Interdisciplinary—Trivium and Trivia for a Freshman Class"
Joan Baum, Director of Freshman English, York College

"A Reading, Writing, Speech Program—Titanic or Good Ship Lollypop"
Marie Lederman, Department of English, Bernard M. Baruch College

English as a Second Language I: Testing, Placement and Exit Criteria—STUDIO 108
Diana Diaz, Director of Freshman English, Hostos Community College
John Haskell, University of Puerto Rico, Rio Piedres
Bobbie Hess, Manhattan Community College
Martha Kornblum, Queens College
Robert Viscount, Kingsborough Community College

"Refining Cloze Testing and Scoring Procedures for Use with ESL Students"
John Haskell, University of Puerto Rico, Rio Piedres

Open Sequence I—PARLOR A
The Arts as an Instructional Form in Language Learning I

"Teaching the Imagination: The Use of Educational Drama in Writing Skills"
John Sharpham, Department of Theatre, Illinois State University

READING WORKSHOPS 10:00 a.m. - 12:00 noon

A Typical College Reading Program: Diagnosis, Placement, Methods and Materials—STUDIO 116
Bertha Doleman, Department of Special Programs, City College

Reading in Content Areas: Social Sciences—STUDIO 104
Shirley Aaronson, Department of Basic Skills, Queensborough Community College
Steven Cole, Department of History, Queensborough Community College

Reading in the Content Areas: Natural Sciences—WINDSOR TERRACE
Lorraine Beitler, Coordinator, Allied Health Learning Center, New York City Community College
Irene Martin, Allied Health Learning Center, New York City Community College
Lucia Anderson, Department of Biology, Queensborough Community College
Joan Kimmelman, Department of Basic Skills, Queensborough Community College

Reading in the Content Areas:
Humanities– WINDSOR COURT
Morton Fuhr, Department of English, Kingsborough Community College
Theodore Simms, Department of English, Staten Island Community College
Edward Seltzer, Department of Philosophy, Division of Social Sciences, Queensborough Community College

MATHEMATICS WORKSHOP
10:00 a.m. - 12:00 noon—WINDSOR BALLROOM

Plenary Session
"Is There a Right Way to Teach Mathematics and Is There a Right Mathematics to Teach?"
Distinguished Professor Dr. Louis Auslander, The Graduate Center, City University of New York

SPECIAL WORKSHOP
10:00 a.m. - 12:00 noon—STUDIO 115

"Grants and How to Write Them"
Richard Donovan, Associate Dean for Educational Development, Bronx Community College
Samuel Vernoff, Grants Officer, Bronx Community College
Andrew Ciafolo, Director, College Relations and Development, Bronx Community College

LUNCH
12:00 noon - 1:30 p.m.

MATHEMATICS IN ACTION
12:45 p.m. - 1:30 p.m.—STUDIO 102

Special Brief Demonstrations:
Ada Peluso, Director of Freshman Mathematics, Hunter College
Joseph Feit, Department of Mathematics, Kingsborough Community College
Miriam Hecht, Director of Freshman Mathematics, Hunter College

Special Computer Terminal Consultant:
Philip Greenberg, Department of Mathematics, Kingsborough Community College

Exhibit-Demonstration: The Williams and Wilkins Company, Publishers of Books and Periodicals in Medicine and Science, Baltimore, Maryland

Computer Courtesy of Digital Equipment Corporation.

WORKSHOP SESSIONS
1:30 p.m. - 5:00 p.m.

ENGLISH WORKSHOPS
1:30 p.m. - 4:00 p.m.

Assessment of Learner Strengths and Weaknesses: Placement and Diagnostic Testing II—STUDIO 103

"Testing and Its Relationship to Developmental Sequence"
Fred I. Godshalk, Senior Examiner, Educational Testing Service, Princeton, N.J.
Ralph Dawson, Nairobi Research Institute, California State University
Andrew Henderson, Department of Academic Development, Medgar Evers College

Preparation of Open Admissions Teachers II—STUDIO 127

"The Graduate Literature Degree Vs. the Needs of Open Admissions Teachers"
Beryl Bailey, Department of English, Hunter College, Host
Edmond L. Volpe, Department of English, City College

Dynamics of Classroom Organization II—STUDIO 121

"Problem Solving in Small Groups"
Dr. Stephen Weidenborner, Director of Freshman English, Kingsborough Community College, Host
Kenneth Bruffee, Director of Freshman English, Brooklyn College
Sol Magzamen, Director, English Workshop, Kingsborough Community College

The Components of a Freshman English Writing Program II—STUDIO 131

"The City College Program"
Marilyn Samuels, Department of English, City College
Gerald Kauver, Department of English, City College
Betty Rizzo, Department of English, City College
Leslie Guster, Department of English, City College
Patricia Laurence, Department of English, City College
Bella Halsted, Department of English, City College
Gerald Gould, Department of English, City College

Interdisciplinary Approaches to Writing Skills II—STUDIO 107

"The Trivium and Quadrivium Ain't Where It's At—Rhetoric as an Intra-disciplinary Response to Open Admissions"
Joan Baum, Director of Freshman English, York College, Host
James Como, Department of Speech, York College

"Language Skills and the Living Theatre"
Doris da Rin, Department of English, Bernard M. Baruch College
John Sharpham, Department of Theatre, Illinois State University
Albert Bermel, Department of Speech and Theatre, Herbert H. Lehman College

English as a Second Language II: Teaching Composition to Open Admissions Students—STUDIO 112
Irene Dutra, Bronx Community College
Gloria Gallingane, Bronx Community College
Linda Kunz, Hunter College
Jean Withrow, Manhattan Community College

Open Sequence II—STUDIO 115
Poetry in Residence: For the Love of Words I

"The Use of Poetry in Development of Writing Skills"
Terry Stokes, Department of English, University of Hartford

READING WORKSHOPS
1:30 p.m. - 3:00 p.m.

A Typical College Reading Program: Diagnosis, Placement, Methodology and Materials—STUDIO 108
Samuel Lourie, Department of Basic Skills, Queensborough Community College
James Shepherd, Department of Basic Skills, Queensborough Community College

In-Service Training for Faculty in Reading Improvement Divisions and Social Sciences—STUDIO 104
Shirley Aaronson, Department of Basic Skills, Queensborough Community College
Steven Cole, Department of History, Queensborough Community College

In-Service Training for Faculty in Reading Improvement Divisions and Natural Sciences—PARLOR A
Lorraine Beitler, Coordinator, Allied Health Learning Center, New York City Community College
Irene Martin, Allied Health Learning Center, New York City Community College
Lucia Anderson, Department of Biology, Queensborough Community College
Joan Kimmelman, Department of Basic Skills, Queensborough Community College

In-Service Training for Faculty in Reading Improvement Divisions and Humanities—STUDIO 118
Morton Fuhr, Department of English, Kingsborough Community College
Theodore Simms, Department of English, Staten Island Community College
Edward Seltzer, Department of Philosophy, Division of Social Sciences, Queensborough Community College

READING WORKSHOPS
3:30 p.m. - 5:00 p.m.

Approaches to Instruction in Reading Improvement: Team Teaching—STUDIO 116
Anita Appleby, Chairperson, Department of Academic Skills, Herbert H. Lehman College
G. Wylie Sypher, Chairperson, Department of History, Herbert H. Lehman College

Approaches to Instruction in Reading Improvement: Co-Teaching—STUDIO 118
Phyllis Cash, Department of Academic Skills, Herbert H. Lehman College
Richard Gerber, Department of History, Herbert H. Lehman College

Approaches to Instruction in Reading Improvement: Skills Core Approach—STUDIO 104
Oliver Patterson, School of Education, City College
Rudi Gedamke, Department of Special Programs, City College

Innovative Methodologies in Reading Improvement—PARLOR A

"The Music of Reading"
Bernadette O'Brien, Guggenheim Museum Project, New York City

MATHEMATICS WORKSHOPS
1:30 p.m. - 4:00 p.m.

Let's Talk About Our Problems I—WINDSOR COURT
Distinguished Professor Dr. Louis Auslander, The Graduate Center, City University of New York, Discussion Leader

"Why Students Have Trouble With Mathematics and What Can Be Done About It"
Richard Schwartz, Department of Mathematics, Staten Island Community College

"Remarks About the New Mathematics"
Banesh Hoffman, Department of Mathematics, Queens College

"Problems of Course Development and Partial Replication"
Edwin Moise, Department of Mathematics, Queens College

Let's See What Is Working: Mathematics in Nature and Art I
1:30 p.m. - 3:15 p.m.—WINDSOR TERRACE
Jules Burstein, Division of Natural Environment, LaGuardia Community College

Let's See What Is Working: The Modular Approach to Mathematics Remediation I
3:30 p.m. - 5:00 p.m.—WINDSOR TERRACE

"The Modular System—A Possible Solution to Teaching the Remedial Student"
Gerald S. Lieblich, Department of Mathematics, Bronx Community College

"Teaching Mathematics in Modules: The Staten Island Community College Experience"
Michael J. Sormani, Director of Freshman Mathematics, Staten Island Community College

"Modules in Remedial Mathematics"
John Miller, Director of Freshman Mathematics, City College

Let's Teach It Better
1:30 p.m. - 4:00 p.m.—WINDSOR BALLROOM

Symposium Leaders
Thomas Joyce, Department of Mathematics, Hostos Community College
Sally Lipsey, Department of Mathematics, Brooklyn College

THURSDAY, NOVEMBER 8, 1973

8:30 a.m. - 9:30 a.m.
REGISTRATION—WINDSOR GALLERY

9:00 a.m. - 5:00 p.m.
MATHEMATICS IN ACTION—STUDIO 102
READING IN ACTION—STUDIO 119
FACULTY LOUNGE CLUB SUITE EAST & WEST*

WORKSHOP SESSIONS
9:30 a.m. - 12:30 p.m.

ENGLISH WORKSHOPS
9:30 a.m. - 11:00 a.m.

Assessment of Learner Strengths and Weaknesses: Placement and Diagnostic Testing III STUDIO 103

"The Writing Sample and the Objective Test"
Fred I. Godshalk, Senior Examiner, Educational Testing Service, Princeton, N.J.
Ralph Dawson, Nairobi Research Institute, California State University
Andrew Henderson, Department of Academic Development, Medgar Evers College

*FACULTY LOUNGE IN CLUB SUITE EAST AND WEST WILL BE USED FOR A WORKSHOP SESSION IN THE ENGLISH AREA FROM 11:00 a.m. TO 1:00 p.m. IT WILL REMAIN OPEN FOR RELAXATION AND PRIVATE DISCUSSION DURING THE REMAINDER OF THE CONFERENCE DAY.

Preparation of Open Admissions Teacher III—STUDIO 127

"Orientation and In-Service Training for English Teachers"
Beryl Bailey, Department of English, Hunter College, Host
Jack Wolkenfeld, Department of English, Kingsborough Community College

Dynamics of Classroom Organization III (to 12:00 noon)—WINDSOR TERRACE

"Using the Students' Affective Resources to Develop Cognitive Skills"
Stephen Weidenborner, Director of Freshman English, Kingsborough Community College, Host
Carol Schoen, Department of English, Herbert H. Lehman College
Elaine Avidon, Department of English, Herbert H. Lehman College

The Components of a Freshman English Writing Program III—STUDIO 107

"The Queens College Program"
Robert Lyons, Director of Freshman English, Queens College, Host
Donald McQuade, Department of English, Queens College
Marie Ponsot, Department of English, Queens College

Interdisciplinary Approaches to Writing Skills III—PARLOR A

"LIBRA: Liberation and Literacy"
Joan Baum, Director of Freshman English, York College, Host
Dexter Fisher, Coordinator of Basic Skills, Hostos Community College

English as a Second Language III: The Silent Way—Pros and Cons—WINDSOR COURT
Larry Anger, LaGuardia Community College
Rosalind Blanck , Manhattan Community College
Rosalio Gingras, Queens College
Dorien Grunbaum, Manhattan Community College
Frank Scimone, Bernard M. Baruch College

Open Sequence III—STUDIO 115

Poetry in Residence: For the Love of Words II

"The Use of Poetry in Development of Writing Skills"
Terry Stokes, Department of English, University of Hartford

Open Sequence IV
9:30 a.m. to 12:00 noon—STUDIO 104

"Media Learning and Technology in the Classroom"
Lynn McVeigh, Department of Educational Technology, Hunter College
Alana Collos, Department of English, Bronx Community College
Denis Sivack, Department of English, Kingsborough Community College

ENGLISH WORKSHOPS
11:00 a.m. - 12:30 p.m.

Assessment of Learner Strengths and Weaknesses: Placement and Diagnostic Testing IV—STUDIO 103

"A Review of Available Tests"
Fred I. Godshalk, Senior Examiner, Educational Testing Service, Princeton, N.J.
Ralph Dawson, Nairobi Research Institute, California State University
Andrew Henderson, Department of Academic Development, Medgar Evers College

Preparation of Open Admissions Teachers IV—STUDIO 127

"The Nature of Accountability"
Beryl Bailey, Department of English, Hunter College, Host
Student-Faculty Panel.

Dynamics of Classroom Organization IV—WINDSOR TERRACE
(continued, to 12:00 noon)

"Using the Students' Affective Resources to Develop Cognitive Skills"
Stephen Weidenborner, Director of Freshman English, Kingsborough Community College, Host
Carol Schoen, Department of English, Herbert H. Lehman College
Elaine Avidon, Department of English, Herbert H. Lehman College

The Components of a Freshman English Writing Program IV—STUDIO 107

"The Queens College Program"
Robert Lyons, Director of Freshman English, Queens College, Host
Donald McQuade, Department of English, Queens College
Marie Ponsot, Department of English, Queens College
George Mandelbaum, Department of English, Queens College
Lynne Rosenthal, Department of English, Queens College
Louise Yelin, Department of English, Queens College
Gail Edwin, Department of English, Queens College

Interdisciplinary Approaches to Writing Skills IV—CLUB SUITE EAST & WEST

"The Literature of Jazz—Music and Written Language"
Joan Baum, Director of Freshman English, York College, Host
William Lowe, Department of English, Kingsborough Community College

English as a Second Language IV: Sequential Development, the Syllabus and Textbook Evaluation—STUDIO 116

Donald R. H. Byrd, Coordinator, Conference ESL Workshops, LaGuardia Community College and the Graduate Center
Marilyn Rosenthal, Department of English, York College

Open Sequence V—WINDSOR COURT

"Tutorial Assistants in an English Writing Program"
Louise Roberts, Department of English, City College

READING WORKSHOPS
9:30 a.m. - 12:00 noon

The ABCs of College Reading Program—STUDIO 108
Alexander Simon, Department of Special Educational Services, Bronx Community College

The Function of Tutorial Assistants in a College Reading Program—PARLOR C
Irwin Bergman, Department of Basic Skills, Queensborough Community College

Reading Skills Instruction in English as a Second Language Courses—STUDIO 121
Gay Brooks, Manhattan Community College
Linda Markstein, Manhattan Community College
Robert Lugton, Brooklyn College
Elaine Newman, Queens College
Alice Osman, LaGuardia Community College

Innovative Methodologies in Reading Improvement — EAST BALLROOM Part I
Philip Stander, Chairperson, Department of Behavioral Sciences, Kingsborough Community College, Introduction

Voices, Incorporated
9:30 a.m. - 10:30 a.m.

"Performance"

Intensive Workshop, Part II
10:30 a.m. - 11:30 a.m.

Philip Stander, Chairperson, Department of Behaviroral Sciences, Kingsborough Community College
Madelon Stent, Department of Education, City College
Jeanne Heningburg, President, Arts for Racial Identity, Inc.

MATHEMATICS WORKSHOP
9:30 a.m. - 12:00 noon—WINDSOR BALLROOM

Plenary Session.
"Curriculum Development in Mathematics"
William Zlot, Department of Mathematics Education, New York University

SPECIAL WORKSHOP
10:30 a.m. - 12:00 noon—STUDIO 112

"Grants and How to Write Them"
Seymour Reisin, Associate Dean for Continuing Education and Community Services, Bronx Community College
Samuel Vernoff, Grants Officer, Bronx Community College
Andrew Ciafolo, Director, College Relations and Development, Bronx Community College

SPECIAL WORKSHOP
9:30 a.m. - 12:00 noon—PARLOR B

"Opportunities in Multi-Media Science Instruction"
Gerald Posner, Director, Center for Educational Experiment and Development, City College
Joseph Muzio, Department of Biology, Kingsborough Community College

LUNCH
12:30 p.m. - 1:30 p.m.

MATHEMATICS IN ACTION
1:00 p.m. - 1:30 p.m.—STUDIO 102

Special Brief Demonstrations:
Ada Peluso, Director of Freshman Mathematics, Hunter College
Joseph Feit, Department of Mathematics, Kingsborough Community College
Miriam Hecht, Director of Freshman Mathematics, Hunter College

Special Computer Terminal Consultant:
Philip Greenberg, Department of Mathematics, Kingsborough Community College

Exhibit-Demonstration:
The Williams and Wilkins Company, Publishers of Books and Periodicals in Medicine and Science, Baltimore, Maryland

Computer Courtesy of Digital Equipment Corporation

WORKSHOP SESSIONS
1:30- 5:00 p.m.

SPECIAL WORKSHOP
1:30 p.m. - 3:30 p.m.—PARLOR B

"Opportunities in Multi-Media Science Instruction"
Gerald Posner, Director, Center for Educational Experiment and Development, City College
Joseph Muzio, Department of Biology, Kingsborough Community College

ENGLISH WORKSHOPS
1:30 p.m. - 3:00 p.m.

Assessment of Learner Strengths and Weaknesses: Placement and Diagnostic Testing V—STUDIO 103

"Testing and the Heterogeneity of Open Admissions Students"
Ralph Dawson, Nairobi Research Institute, California State University
Lucille G. Shandloff, Basic Writing Workshop, Department of Freshman and Developmental English, Hunter College
Andrew Henderson, Department of Academic Development, Medgar Evers College

Preparation of Open Admissions Teachers V—PARLOR G

"Working Session: Development of Proposals for the Future"
Beryl Bailey, Department of English, Hunter College, Host

Dynamics of Classroom Organization V—STUDIO 121

"The Supermarket Approach--The Open Classroom"
Stephen Weidenborner, Director of Freshman English, Kingsborough Community College, Host
Lillian Sanchez de Probst, Department of English, Kingsborough Community College
Irene Kleinman, Department of English, Kingsborough Community College

The Components of a Freshman English Writing Program V—PARLOR A

"Peer Tutoring: An Alternative to Dropping Out—The Use of Videotape Simulation in the Training of Peer Tutors"
Randolph Tarrier, Director, The Guidance Laboratory, City University of New York
Bert Flugman, The Guidance Laboratory, CUNY
Betty Oliver, The Guidance Laboratory, CUNY

Interdisciplinary Approaches to Writing Skills V —STUDIO 108

"The Use of Interdisciplinary Methods for Underprepared Students"
Joan Baum, Director of Freshman English, York College, Host
Ivo Duchacek, Department of Political Science, City College
Herbert Nechin, Department of Psychology, City College
Jack Gould, Department of English, City College

English as a Second Language V: Recent Research —STUDIO 116

"Is Second Language Learning Like First Language Learning?"
Nathalie Bailey, Queens College
Carolyn Madden, Queens College

"Two Experiments With Adult Second Language Learning: Is Instruction Necessary? Hemisphere Dominance, Cognitive Style and Language Learning"
Stephen Krashen, Queens College

"Proposals and Suggestions for English as a Second Language Programs in the City University of New York"

OPEN SEQUENCE VI—STUDIO 118

"Definition of Performance Objectives"
Lois Lamdin, Chairperson, Department of English, Hostos Community College

ENGLISH WORKSHOP
3:00 p.m. - 4:30 p.m.—WINDSOR BALLROOM

Plenary Session
"Conclusions and Proposals"
Roderick Loney, Chairperson, Department of Academic Development, Medgar Evers College, Host

READING WORKSHOPS
1:30 p.m. - 3:00 p.m.

The Sixth Grade Level Reader in College—STUDIO 104
Helen LeFevre, Department of English, Community College of Philadelphia

A Coordinated Summer Skills Program—STUDIO 127
Ilona Henderson, Department of College Skills, City College, Host
Celestine Akuba, Department of Special Programs, City College, Host
Rufus Davis, Department of Special Programs, City College
Fernando Gonzales, Department of Special Programs, City College
George McDonald, Department of Special Programs, City College
Jack Dickson, Department of College Skills, City College
Melvin Norment, Social Science Survey Division, City College
Nathaniel Norment, Department of English, City College
Lynn Sage, Department of Speech, City College

Television and Media: Applications in Reading Programs—STUDIO 115
Betsy Kaufman, Director, College Skills, Queens College

Assessment and Evaluation in the Reading Program—STUDIO 107
George Alterman, Dean of Instruction, Queensborough Community College
Leslie Berger, University Dean for Academic Evaluation, Board of Higher Education, City University of New York
George O. Phillips, Reading Program, Graduate School of Education, Queens College

READING WORKSHOP
3:00 p.m. - 4:30 p.m.—WINDSOR TERRACE

Plenary Session
"Conclusions and Proposals"
Paul Panes, Chairperson, Department of Basic Skills, Queensborough Community College, Host

MATHEMATICS WORKSHOPS
Let's Talk About Our Problems II
1:30 p.m. - 3:00 p.m.—WINDSOR TERRACE
William Zlot, Department of Mathematics Education, New York University, Discussion Leader

"Problems of Curriculum Development"
Charles Leake, Department of Mathematics, Bronx Community College

"Subverting the Passive Student"
Leonard Saremsky, Division of Natural Environment, LaGuardia Community College

"Problems of Curriculum Development"
Arnold Kleinstein, Division of Natural Environment, LaGuardia Community College

Let's See What Is Working: Mathematics in Nature and Art II
1:30 p.m. - 3:00 p.m.—PARLOR C
Jules Burstein, Division of Natural Environment, LaGuardia Community College

Let's See What Is Working: The Modular Approach to Mathematics Remediation II
3:00 p.m. - 4:30 p.m.—PARLOR C

"The Modular System—A Possible Solution to Teaching the Remedial Student"
Gerald S. Lieblich, Department of Mathematics, Bronx Community College

"Teaching Mathematics in Modules: The Staten Island Community College Experience"
Michael J. Sormani, Director of Freshman Mathematics, Staten Island Community College

"Modules in Remedial Mathematics"
Gerald Weinstein, Department of Mathematics, City College

Let's Teach It Better
1:30 p.m. - 4:00 p.m.—WINDSOR COURT

Symposium Leaders:
Enid Sharpe, Department of Mathematics, City College
Michael Potter, Department of Mathematics, Bronx, Community College